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THE UNIVERSAL  
Text Book of Photography :  
OR  
MANUAL  
OF THE VARIOUS  
PHOTOGRAPHIC PROCESSES,  
Instruments, Art Desiderata, &c.,

WITH  
A CHAPTER ON THE ÆSTHETICS OF PHOTOGRAPHY,  
FROM THE FRENCH OF MONSIEUR DISDERI.

SECOND EDITION. THIRD THOUSAND.

ILLUSTRATED AND ENLARGED.

"KNOWLEDGE IS POWER."

LONDON :

T. T. LEMARE, WHOLESALE BOOKSELLER, PATERNOSTER ROW.

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HARVEY, REYNOLDS, & FOWLER, 10, BRIGGATE.

PRINTED BY STEAM BY JOHN BELLOWES, WESTGATE, GLOUCESTER.

1864.



THE UNIVERSAL  
TEXT BOOK OF PHOTOGRAPHY.

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"There is more than the value for the trifling cost of the pamphlet, which, unlike those of most other dealers in apparatus, is not swelled out by lists of prices and advertisements."—The British Journal of Photography.

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PUBLISHED BY  
HARVEY, REYNOLDS, & FOWLER, 10, BRIGGATE,  
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THE UNIVERSITY

of London

MANUAL

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BY

W. J. L.

A CHAPTER ON THE SCIENCE OF PHOTOGRAPHY

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## Preface to First Edition.

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HAVING had considerable intercourse with practical Photographers for many years, and knowing the difficulties and disappointments that not unfrequently beset a beginner in this beautiful art, we are induced to publish the present Work, so that the experience of the more advanced may be rendered useful by being related to the less proficient Student.

Freedom from failure does not depend so much upon a particular recipe as upon general care in manipulation; and although we have given a number of formulæ, it is not that all should be followed, but that the one most suitable should be selected, and if found successful in working, should be afterwards adhered to.

We believe the article on the "ÆSTHETICS OF PHOTOGRAPHY," for which we are indebted to M. DISDERI, will be found useful in imparting materials for thought; and we hope it may do something towards elevating the ideas of many of the followers of this interesting art.

We would express our sincere acknowledgements to all who have assisted us in this work, and we hope that our united efforts may meet with approval.

HARVEY, REYNOLDS, & FOWLER,

10, BRIGGATE, LEEDS.



## Preface to Second Edition.

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Through the favour with which the First Edition of our "Universal Text-Book of Photography" has been received, we are enabled to speedily issue our Second. In this, we have endeavoured to correct faults which existed previously, and to add a quantity of new and valuable matter.

We beg cordially to acknowledge the kindness and liberality of those who have contributed to these pages, and to thank our many friends for the favourable opinions they have been pleased to express on our first undertaking. We trust that the present work will meet with equal approbation, and will be found useful to those who practice the Art and Science of which it treats.

HARVEY, REYNOLDS, & FOWLER,

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# THE UNIVERSAL TEXT BOOK OF PHOTOGRAPHY.

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## CHAPTER I.

### PHOTOGRAPHS ON GLASS.

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#### 1.—MATERIALS EMPLOYED.

**T**HE choice of materials required in the different manipulations in Photography is one of the most important considerations to a beginner, for unless a great amount of care is used in selecting them of the kind suitable for the process to be followed, endless trouble will be the result; it is better, therefore, to trust to some friend who understands them, or rely on the house that supplies them. The most important of all the apparatus used is the Lens, for unless it is of a good quality, the best results need not be expected; therefore the first consideration is to purchase one from a respectable house, of a good maker. It is, also, important in choosing a lens, to bear in mind the object for which it is required; for a lens that would give excellent results in one class of work would be equally bad for another. For portraits, none except the double achromatic lenses are used; and, as there is a great demand for the Carte de Visite portraits, we should recommend a lens of large aperture to be employed in their production. If these portraits are attempted with any inferior lens, nothing smaller than half size should be used,—a full-plate lens answers very well for them. M. Disderi, of Paris,



the commoner photographic chemicals are subject, and have indicated some of the means of detecting them. To have pursued the subject fully, would have exceeded the limits of the present volume,—but we shall feel that our end has been accomplished, if we are helping to introduce purer articles to our photographic friends, or enabling them to know whether they can rely upon a chemical before they take it into use. Some knowledge of the laws and processes of chemistry is necessary in applying tests for impurities, and we would impress upon all who are not familiar with this wonderful science, that a study of it cannot fail to yield them much interest and delight.

**ACETIC ACID.**—This acid as used in photography is of three strengths, —that known as Beaufoy's (from the name of a celebrated maker)—that which may be frozen at a temperature of  $32^{\circ}$ , and that solid at  $50^{\circ}$ . All these may be equally pure, they differ only in the proportion of real acetic acid which they contain; that which freezes at the highest temperature containing the greatest quantity. They should all be colourless, free from an empyreumatic or burnt wood odour, and a drop should leave no residue if evaporated on a slip of glass. Neither sulphuretted hydrogen, nitrate of barytes, nitrate of silver, or ferrocyanide of potassium should cause any change in them. We may here mention a curious fact with respect to the acetic acid, solid or glacial at  $50^{\circ}$ . It often happens that this acid is liquid at  $50^{\circ}$ , or even at  $40^{\circ}$ , and will remain so, unless the bottle containing it be shaken, or the stopper taken out; then, beautiful feathery crystals frequently begin to form, and in a few minutes the acid, which only a minute previously was liquid, will have changed into a perfectly crystalline and frozen mass. This reaction, however, is uncertain;—when it happens it may be taken as a certain sign that the acid is of the highest strength. If in passing sulphuretted hydrogen through acetic acid a milky appearance is observed, sulphurous acid is denoted, and the sample of acetic acid is unfit for photographic purposes.

**HYDROCHLORIC ACID.**—Should be colourless, and have a specific gravity, ranging from 1.11 to 1.14; emits white fumes when exposed to the air. Sulphuric acid may be detected by first diluting the suspected hydrochloric acid with pure distilled water, and then adding solution of chloride of barium, which produces a white precipitate if sulphuric acid



be present. Sulphuretted hydrogen should not cause a precipitate ; if a black one occurs, it may indicate lead ; if yellow, arsenic. This latter is not unfrequently met with in acid sold as *pure*, but generally in such *minute* quantities as not to prevent its use for photographic purposes.

**NITRIC ACID.**—Should be colourless, have a specific gravity from 1.3 to 1.42. There is a nitric acid of a specific gravity of 1.5, but it is seldom if ever used in photographic operations. If nitric acid be of a slight yellow colour, it may arise from the decomposition of organic matter, or from containing hyponitric acid,—the latter impurity may be got rid of by boiling. If solution of chloride of barium produce a precipitate in the diluted nitric acid, sulphuric acid is present. Nitrate of silver producing a precipitate indicates hydrochloric acid.

**PYROGALLIC ACID.**—Should be well crystallized, should dissolve without residue in water and alcohol, and if strongly heated on a piece of platinum foil should be entirely dissipated. Some pyrogallic acid will become “powdery” by keeping. If this acid be put in a bottle which is not perfectly clean it will become brown from contact with the dirt or dust in the bottle. Adulterations should be suspected in all samples that are dull and “powdery.”

**FORMIC ACID.**—Colourless, sharp pungent smell, something like acetic acid. Mixes well in all proportions with water, alcohol, and æther. If white precipitates are produced by solution of nitrate of silver, or chloride of barium, hydrochloric or sulphuric acids are present. Acetic acid is detected by diluting a small portion of formic acid with water, boiling this with excess of peroxide of mercury, and filtering as soon as the effervescence is over. If one portion of this gives a black precipitate with sulphuretted hydrogen, and another portion feathery or white scaly crystals on evaporation, acetic acid is present.

**SULPHURIC ACID.**—A white oily liquid, excessively corrosive. Specific gravity 1.800 to 1.844 ; a brown color generally arises from the presence of organic matter. Sulphuretted hydrogen should give no precipitate, indicating the absence of arsenious acid and oxides of lead and tin. Ferrocyanide of potassium, in solution, should give no colouration, showing freedom from iron.

**ÆTHER.**—There are various æthers, known as sulphuric, nitric, acetic æthers, &c., &c. They are formed by the action of the various acids upon



alcohol;—nitric acid producing nitric æther,\* &c. It is sulphuric æther which is best known, and is more properly called æther. It is of different strengths, owing to the varying proportions of alcohol and water contained in it. It is highly inflammable, both in a liquid and vaporized condition, and should be carefully kept at a distance from any ignited body, *Absolute* æther, or sulphuric æther containing neither alcohol nor water has a specific gravity of  $\cdot 720$ . The sulphuric æther generally sold has a specific gravity of  $\cdot 740$  to  $\cdot 750$ . Since the law was passed allowing "methylated" spirits of wine to be used in commerce, free of duty, another variety of sulphuric æther has arisen, viz., methylated sulphuric æther, or æther produced from the methylated instead of the pure spirits of wine. This, of course, is much lower in price than the pure article, and has generally a lighter density;  $\cdot 730$  being a usual specific gravity. Its use, however, is not to be recommended, and the best collodions, including of course the foreign makes, are not manufactured from "methylated æther." This æther can generally be distinguished from the other by rubbing a few drops on the back of the hand, allowing them to evaporate, and observing the peculiar smell of vegetable naphtha which is left. All sulphuric æthers should be colourless, neutral to test papers, and leave no residue on evaporation. A high specific gravity probably indicates the presence of water or spirits of wine, absolute æther being soluble in 10 parts of the former, and in any proportion of the latter.

ALCOHOL.—This substance, like æther, is of different strengths, and of several varieties, and is also highly inflammable. The kind we have to do with is produced by the fermentation of cereals, or of grapes. The latter is a purer alcohol and of better flavor than the former, and is only manufactured on the continent, where the fruit is plentiful. It is called spirits of wine because it is the "spirit" or essence of wine and all fermented liquors. The absolute alcohol (without any water) has a specific gravity of  $\cdot 792$ , though

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\* Our chemical friends will know that the action of sulphuric acid upon alcohol is not *precisely* the same as that of the other acids; for whereas the latter produces salts of the oxide of ethyle as nitrate of oxide of ethyle or nitric æther, sulphuric acid does not produce sulphate of oxide of ethyle, but only the hydrated oxide of ethyle or æther. It is called sulphuric æther simply because sulphuric acid is used in producing the decomposition of the alcohol to form the æther.



that generally sold is often as high as .800 from its containing 1 to 2 per cent. of water. Both absolute æther and absolute alcohol are difficult and troublesome to prepare, hence the higher price. The alcohol usually sold as spirits of wine has a specific gravity of .832 to .840. The "methylated" spirits of wine is made by adding naphtha to pure alcohol, in order to render it unpalatable, and so prevent its being drunk. Although introduced as a measure beneficial to commerce, its use has been greatly abused, and should be *decidedly discouraged* wherever its employment is likely to be attended with disappointment or positive injury, as in the preparation of collodions, medicines, &c. It is not injurious, we believe, when used in developing solutions, but it is not wise to use it even for making varnishes, as the naphtha with which it is mixed has the property of dissolving gun cotton. This cheaper alcohol may be known by allowing a few drops to evaporate on the back of the hand, and observing the odour produced as with methylated æther. If the pure spirits of wine, treated in this same way, should leave a repulsive odour, it indicates the presence of an impurity—fusil oil—and should be rejected for photographic purposes. It should be perfectly colourless, leave no residue on evaporation, and be quite neutral to test papers. If of a higher specific gravity than .832, there is more water than is proper, and it will probably contain less than 85 per cent. of pure alcohol, which is its standard proportion.

AMMONIUM, IODIDE.—A white crystalline substance, though generally met with in commerce of a bright yellow or brown colour, due to the separation of a little iodine. Should this colour be an objection, it can be restored by allowing the salt to remain in bibulous paper for a few hours, turning it once or twice. It should leave no residue if heated on a piece of platina foil; and should give a yellow precipitate with nitrate of silver, the whole of which should be soluble in a saturated solution of iodide of ammonium or potassium. This salt should also be quite soluble in strong alcohol.

AMMONIUM, CHLORIDE.—Should be white, and its solution unaffected by sulphide of ammonium. Perfectly dissipated by heating on platina foil.

AMMONIUM, BROMIDE.—The presence of chloride of ammonium in this salt may be suspected if the precipitate produced in its solution by nitrate of silver turns violet *rapidly* in sunshine.



CADMIUM, IODIDE AND BROMIDE.—Heavy metallic salts—the bromide crystallizing in white shining needles, the Iodide in pearly tablets. Both should be colourless and dissolve perfectly in alcohol or water.

GOLD, CHLORIDE.—This term is applied to several substances, which differ considerably in composition. Absolute chloride of gold, or more properly ter-chloride, is of such an exceedingly deliquescent nature that it crystallizes with difficulty, and its crystals absorb moisture so rapidly that weighing it and putting it into the little tube bottles are almost impossible operations, hence the addition of an alkaline chloride to render it easier of manipulation, and of greater keeping properties. If the absolutely pure ter-chloride of gold be required, it should be bought in *solution* of definite strength. The labels on the small tube bottles, "Chloride of Gold, 15 grains equal to 7 grains of Metallic Gold," are, strictly speaking, incorrect, as 7 grains of pure metallic gold only form 10.75 of pure absolute ter-chloride of gold. The remaining 4.25 grains are composed of chloride of sodium for the purposes above mentioned, and a little unavoidable moisture. As, however, purchasers pay only for the 7 grains of pure metallic gold, the addition of so much chloride of sodium makes no difference *commercially, provided, of course, that quantity is never exceeded*. Again, pure ter-chloride of gold is an acid salt, and before using in photography that acid must be neutralized: if this be done with carbonate of soda, chloride of sodium is formed, and thus a compound is formed of similar composition to that sold in the tube bottles in dry crystals as chloride of gold. Those who prefer buying their chloride of gold pure, and "mixing it" themselves, should purchase the acid solution. The calcio-chloride of gold is the ter-chloride with a lime salt, supposed to influence its toning properties. In examining a sample of chloride of gold, therefore, the point to be determined is the quantity of metallic gold in a given weight of the salt. The easiest way is to proceed as follows:—Weigh the tube with the chloride of gold in it, break the tube and dissolve out the chloride in distilled water, slightly acidulated with hydrochloric acid. Pass sulphuretted hydrogen gas through the liquid for 10 or 15 minutes, collect the precipitate very carefully in a small filter, and thoroughly wash with pure water. Dry the filter with precipitate, and ignite them well in a platina dish; the residue is pure gold, which can then be accurately weighed.



IRON, PROTOSULPHATE.—Crystallizes in *blueish* green crystals, perfectly soluble in water, but insoluble in alcohol. This substance, when damp or exposed to the air, becomes coated with a brown powder due to the peroxidization of the iron. Such crystals should be rejected. The common copperas of commerce should not be used for photographic purposes.

IODINE.—Sold in black scales of a metallic lustre, should be quite soluble in alcohol, and entirely dissipated by heating on a piece of glass. Everything left is impurity, perhaps blacklead.

POTASSIUM, BROMIDE.—Colourless. White cubic crystals, permanent in the air. On heating it fuses into a clear liquid without decomposition. It should remain colourless and not effervesce on the addition of hydrochloric acid, and its solution should not yield a precipitate with chloride of barium.

POTASSIUM, IODIDE.—Colourless. White cubic crystals. It should remain colourless and not effervesce on the addition of hydrochloric acid, and it should remain clear on the addition of solution of chloride of barium. If chloride of potassium be present it may be detected by adding solution of nitrate of silver to a solution of the iodide, till no more precipitate is formed, agitating this precipitate with a small quantity of ammonia, and to this solution adding excess of nitric acid, when, if chloride be present, a precipitate will fall.

POTASSIUM, CYANIDE.—This is met with fused and in crystals. The latter *absolutely* pure is only used in medicine; it is far too expensive, at present, for use for “fixing” in photography; if cyanide of potassium should ever be required for delicate photographic operations, the crystals should be employed. The fused is met with of two varieties, that containing 80 or 90 per cent. and that of 50 per cent. of pure cyanide of potassium, the remaining 10 or 50 per cent. being carbonate and cyanate of potash, &c., which cannot be separated without considerable expense. The presence of these salts to a *moderate* extent is not prejudicial to the present use of cyanide of potassium in photography. *Fifty per cent.* is too high a quantity, such cyanide being only fit for cleaning electro-plate, &c., although some photographers, who are not very particular as to results, and who like cheap things, still use this low quality. Fused cyanide of potassium should have a crystalline appearance when a lump is broken,



and be quite white. The cyanide sold in cylindrical sticks is very much easier to manage in weighing, &c., than the "lumpy" variety. The greatest care should be taken to keep this substance in a place safe from children, &c., as it is a deadly poison. Should any accident happen with it, remedies should be applied *at once*, (see Chapter on Poisons,) and medical aid sent for *immediately*. If any acid should get mixed with a solution of Cyanide of Potassium, vapours are given off of a highly poisonous character; so every precaution should be taken to avoid this by keeping both solution and solid in well stoppered bottles, and distinctly labelled; if the stoppers were tied over with leather it would be an additional safety. As this substance is very deliquescent as well as poisonous, it should never be attempted to be kept in a paper parcel.

SILVER, NITRATE.—Should be nearly or quite neutral to test papers. Nitrate of potash may be detected by the form of its crystals being long prisms, whilst those of the nitrate of silver are in tablets. Nitrate of silver is also soluble in alcohol, whilst nitrate of potash and nitrate of lead are not. This is an article of immense consumption in photography, and is one of the least remunerative to the maker or dealer. In every ounce of this article there are over 260 grains of pure metallic silver, so that its cost to the makers can be nearly estimated when the current value of silver be known, and something added for nitric acid, labour and profit, the last being reduced to almost nothing. A triple crystallized nitrate of silver has been introduced for those who wish to have the advantages and security of three crystallizations instead of two. Probably the higher price allows the makers to spend more care and time over this article than is the case with the other, and thus greater security may be expected against the presence of accidental contaminations, as organic matter, &c.

SODA, ACETATE.—Is soluble in alcohol and water, has generally a faint odour of acetic acid. If it should effervesce on the addition of a little acetic acid it contains a carbonate. Sulphates and chlorides may be detected by solutions of chloride of barium and nitrate of silver producing precipitates in its solution.

SODA, NITRATE.—White crystals, is very useful in preparing the silver solution for exciting albumenized paper. For this purpose it should be pure, and not the common nitrate of soda of commerce.



**SODA, HYPOSULPHITE.**—Should be in white dry crystals, which effloresce slightly in a dry atmosphere. Should dissolve in less than its own weight of cold water. If on mixing solution of nitrate of silver with solution of this salt the resulting precipitate have a grey or even darker tinge, it is contaminated with sulphide of sodium, and is not safe to be used for fixing paper pictures. Its solution should dissolve recently precipitated chloride of silver.

**WATER, DISTILLED.**—Should leave no residue on evaporation on a piece of glass; should give no precipitate with nitrate of silver, chloride of barium, lime water, or oxalate of ammonia. Photographers in the country sometimes find it difficult to procure this article. We would advise them to adopt the following method of obtaining a substitute as nearly pure as possible. Take clear, clean, rainwater, if collected in an earthen pan so much the better; add nitrate of silver about 5 grains to a quart, shake well till dissolved, then place in the sunshine for an hour and filter. This water will serve for preparing the various solutions of nitrate of silver, but will not answer so well for developing solutions, &c. If perfectly clear and clean block, pond, or river ice be thawed, it will yield a very pure water that will answer for all photographic purposes. Photographers in the country would do well to prepare a supply of this pure water in the winter season.

We have spent a little more time over these matters than by some may be thought necessary; but we are sure this is not the case, and believe that if greater attention were paid to the chemical as well as to the manipulatory *details* we should have better pictures than are at present produced.

## WEIGHTS AND MEASURES.

(ENGLISH.)

### APOTHECARIES WEIGHT.


20 grains . . 1 scruple  
60 grains . . 1 drachm  
3 scruples . 1 drachm  
8 drachms. 1 ounce  
480 grains . . 1 ounce  
12 ounces . . 1 pound

### FLUID MEASURE.

60 minims or drops 1 drachm  
8 drachms . . . 1 ounce  
20 ounces . . . . 1 pint  
8 pints . . . . . 1 gallon

### AVOIRDUPOIS WEIGHT.

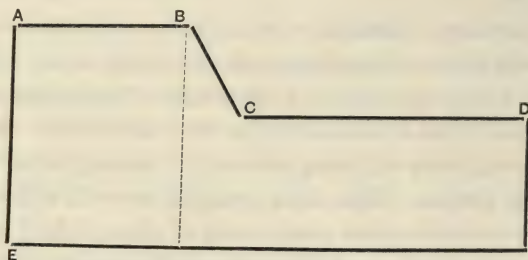
27½ grains . 1 drachm  
16 drachms . 1 ounce  
437½ grains . 1 ounce  
16 ounces . . 1 pound  
28 pounds . 1 qr. cwt.  
4 qrs. or 112 lbs. 1 cwt.

 Chemicals, &c., are always sold by avoirdupois weight,—1 oz. being equal to 437½ grains.



## 2.—CHOICE OF PLACE.

We next come to the proper place for taking pictures. Of course, portraits are best taken in the glass-house. As to the shape and position of the house, there are many differences of opinion. From what we have seen, we believe one made something after the following sketch will be found the most suitable.



Let A, B, C, D, E, F represent a section of one, of which A, B, C, D, is the roof. The end, A, where the sitter should be placed, should be south; the roof should be all glass from A to B, except about three feet from the wall, which may be wood; the sloping part of the roof from B to C should be clear glass; from C to D requires no glass. One side of the house should be without any light whatever; the other side should be glass from the roof to the floor from A to B. This is all the lighting that will be necessary; viz., top-light A, B, C, and side-light A to B. In a gallery constructed on this plan, we have seen excellent well-lighted round pictures produced. Where a glass-house is not available, portraits may be taken in the open air, providing a hood of black cardboard is placed at the end of the lens, and a back-ground is fixed with a part projecting over the head of the sitter, so as to cut off the top-light.

The dark room should be made at the D end of the gallery, near where the camera is placed, so that as little time as possible is lost between the exciting of the plate and the exposure. It should be as capacious as possible, in order not to interrupt the motion of the person when operating. There should be shelves for bottles, and pegs for cloths, with a sink and a plentiful supply of water. Dust should be kept out of this room, and the floor covered with oilcloth; and in summer it is



well to sprinkle it with water. It is essential that the dark room should be well ventilated, as the vapours arising from the cyanide of potassium, &c., are very deleterious. A good plan is to have the window, which is fitted with yellow glass, to slide in a framework,—so that air can be admitted as soon as developing is over,—the plate not being affected by light after the washing subsequent to developing. The glass should be of the dark orange colour, stained with silver, as some kinds of yellow glass are not fit for photographic purposes. A sheet of yellow glass and another of green glass answer very well, and are a good relief to the eye. It is to be understood that all light is to be excluded from this room except what comes through the yellow window, as the least trace of white light falling on the plate would spoil it. Before attempting portraiture, we would advise all beginners to commence by copying some picture or engraving, and make themselves thoroughly masters of the various processes. We have known many persons who have given up Photography in despair from not following this plan.

We now give a résumé of the easiest process in photography, viz., the Collodion Positive.

### 3.—CLEANING THE PLATE.

The glass known as best flatted crown does very well for positives. It should be as free from scratches as possible. It is necessary that it should be very well cleaned. A mixture of tripoli and spirits of wine answers best for new glasses. Old glasses require cleaning with acids. The mixture, which should be made of about the consistency of cream, is well rubbed over each side of the glass while held in the plate-holder, then dried with a clean linen cloth ; and, lastly, polished with a chamois leather. These cloths should be kept to themselves, and used for no other purpose. It is a good plan to clean a number of glasses away from the dark room, and keep them in a plate box, so that they only require a flat camel-hair brush to take off any dust. The glass being well cleaned, the next operation is coating with collodion.

### 4.—COATING THE PLATE.

It is well to keep the collodion in a large stock bottle, and to fill a smaller one from time to time from this, thereby preventing the sediment being poured on the plate, and also giving greater ease to pouring. The operation of pouring on collodion is not so easy to explain, and we

should recommend every beginner to see it done, if possible. The plate should be held horizontally in the left hand, by one of its corners (No. 3); the collodion should be poured on the centre in sufficient quantity to cover the plate easily, by inclining the plate first to No. 1,



then to No. 2, then 3, then 4 (if possible, avoiding the thumb.) When the plate has been thus perfectly covered, return to the bottle from corner No. 4 all the superfluous collodion; raising the glass steadily without haste, then gently tilt the glass from one side to the other, so that any lines formed may run into each other. If any spots are found on the film after coating, they arise either from dust flying about in the dark room, or from the neck of the bottle not having been wiped before pouring, so that some of the dry collodion on the neck of the bottle is carried on to the plate. The plate should not be immersed in the silver bath until it sets or becomes firm. In general a dullness comes over the surface of the plate. No time can be given for this part of the operation, as it depends on the temperature. In warm weather the plate can scarcely be immersed too soon after being collodionized. If kept too long, some parts will be more sensitive than others; the driest parts being least sensitive. If the collodion gets too thick, it can be thinned by the addition of a little æther; if dirty, it should be passed through a collodion filter.

#### 5.—EXCITING THE PLATE.

For this purpose a solution is required of

Triple Nitrate of Silver . . . . .	30 grains.
Distilled Water . . . . .	1 ounce.

A larger quantity than is required to fill the bath should be made; as it is not so liable to get out of order if the bath solution is now and then poured into the stock bottle, the strength being kept up better. The solution having been mixed in the above proportions, a plate coated with collodion should be immersed in it for three or four hours to iodize it. If wanted immediately, pour in about a drachm of collodion to a pint of solution, shake it well, and filter. It should be made slightly acid by the addition of a few drops of dilute nitric acid, or acetic acid,



and it is then ready for use. The collodion having set, is rested on the dipper, and plunged quickly into the bath, taking care not to pause, or a line will be formed across the plate. After the plate has been in the bath about one minute, draw it out once or twice to allow the æther to evaporate, place in the bath again for another minute,—or until the greasy lines disappear,—it is then to be taken out, drained on blotting paper, and put in the carrier of the dark slide, prepared side downwards.

#### 6.—EXPOSURE OF THE PLATE.

While the plate remains in the bath, the subject should be arranged (for which see Chap. on *Æsthetics*.) In most cases a head-rest will be found necessary, to keep the person from moving; the iron ones on a heavy foot are the best, as they can be used for either standing or sitting figures. Your camera being placed upon the stand, is to be pointed to the object. A good plan is to have the sizes of the different glasses marked on the ground glass, so that you can tell whether the picture will fill the size of the glass, and in what part it will fall. To get the focus, loosen the screw at the back of the camera, cover the head and camera with a piece of black velvet or other dark material, and slide the body of the camera backwards and forwards, until the image is most distinct on the ground glass, then tighten the screw, and make the fine adjustment by means of the rack of the lens. It is generally necessary to use a small magnifying glass to focus accurately small figures, or the eyes or other small objects will often be indistinct. The focus being obtained in this manner, you take out the focusing glass from the camera, and put in its place the dark slide containing the prepared plate, place the cap on the front of the lens, and draw up the sliding door of the dark slide. Having the sitter perfectly still, you remove the cap from the lens, when the image is thrown on the prepared plate, and in a few seconds the exposure is complete. The time, of course, varies with the quality of the light, the dress, &c., of the sitter, and the size and focal length of the lens, so that it is impossible any precise time can be given. As the positive process is very quick, and amateurs are apt to give too much time, it is well to commence with giving a short exposure, say three seconds in fine weather; and increasing the time a few seconds for each plate, you will soon find out in

developing which has been timed properly. Supposing the plate has been properly exposed, replace the cap on the lens, put down the sliding door of the dark slide, and take it at once into the dark room. -

#### 7.—DEVELOPMENT OF THE PICTURE.

To develop the picture, a solution is required of

Protosulphate of Iron . . . . .	12 grains.
Nitrate of Potash . . . . .	6 grains.
Glacial Acetic Acid . . . . .	15 minims.
Alcohol . . . . .	10 minims.
Water . . . . .	1 ounce.

Take the plate out of the dark slide, and hold it in the hand in the same way as when pouring on collodion; put about a drachm of the solution into a developing glass, and quickly pour along the bottom of the plate sufficient of the solution to cover it, then gently incline the plate so as to allow the solution to flow backwards and forwards. Be careful not to pour the solution on in one place, or a stain will be the result. On pouring on this solution the image quickly appears; first, the parts most strongly lighted will show themselves, then the more shaded parts. When these are out, pour off the solution, and wash well under a tap; be careful not to wait till the darkest shadows are out, or the beauty of the positive will be lost. If the plate has been over-exposed, the image will start out directly the developer is poured on; if under-exposed, it will take three or four minutes to develop it, and then no detail will be obtained. If the plate has been well washed, you may open the yellow window, as light has no further action on it, and proceed to fix the picture.

#### 8.—FIXING THE PICTURE.

Make a solution of

Cyanide of Potassium . . . . .	10 grains.
Nitrate of Silver . . . . .	$\frac{1}{2}$ grain.
Distilled Water . . . . .	1 ounce.

Then either lay the plate in a gutta percha dish and pour the solution over it, or keep the solution in a dipping bath, same as the silver solution; by the addition of the nitrate of silver you prevent the too rapid action of the cyanide if left in the bath too long. As soon as the yellow iodide of the



silver is dissolved, wash the plate well back and front, and dry it ; when dry, pour on the collodion side some transparent varnish ; and on the other side some dead black varnish, or what is much better, place a piece of maroon velvet behind it.

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## CHAPTER II.

### NEGATIVES BY IRON DEVELOPMENT.

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**T**HE fact that a negative can be produced in dull weather, when one cannot be obtained by the direct method, is a sufficient reason for this process being generally adopted. It has many other advantages: viz., producing greater softness and harmony; producing thinner negatives, thereby requiring only one-quarter the usual time for printing, and giving much more brilliant prints. It is necessary, to produce good pictures, that everything should be in the best working order,—the silver bath should be made of the purest nitrate of silver, free from acid, or with only a trace,—if the triple be used, it will be necessary just to add about twelve drops of dilute nitric acid (sixty drops to the ounce) to the pint of solution. The bath is to be iodized in the same manner as directed for positives. The collodion should be bromo-iodized. Manipulatory details are nearly the same as for positives. Patent plate glass should always be used for the negative process ; the crown glass not being flat enough to bear the pressure in the printing-frame. The exposure should be longer than for a positive. The same iron developing solution as for positives is required;—in summer, fifteen grains of protosulphate of iron to the ounce should be employed, which, in winter, may be increased to twenty-five grains. The development should also be continued longer than for a positive, until all the details are fully

c

out. The picture at this stage should look like an over-exposed and over-developed positive. The plate having been well washed, should be re-developed with

Pyrogallie Acid . . . . .	10 grains.
Citric Acid . . . . .	20 grains.
Distilled Water . . . . .	3 ounces.

Pour this over the plate once or twice, then return to the developing glass, add a few drops of the solution of silver (twenty grains to one ounce,) mix with a glass rod, and pour again over the plate; the picture will rapidly grow more intense; but the exact time to stop this operation can only be learnt by practice, or by comparing the density with a negative which experience has proved to print well; after a good washing, fix in a saturated solution of hyposulphite of soda.

#### REMARKS.

The great difficulty to a beginner in this process is the proper intensity to give his negative. A good iron negative should be thin, and full of gradation; in fact it is possible to get a negative that will give a vigorous print, whose high lights are no stronger than one that will not produce a print at all. In a good negative by iron development, the deepest shadows are generally rendered by clear glass, and the other shadows may be only a few tones higher in the scale, with the highest lights very weak; and still, a good print may be obtained in a short time, which is a great advantage. You may sometimes obtain a beautiful negative by the application of the iron developer alone, by using a neutral bath, but it will generally be found that a re-developing is required. In applying the iron developer, care should be taken to prevent its acting on one place merely. It should be poured quickly along one end of the plate, as near the edge as possible, in such a manner that by slightly tilting the plate, the fluid will flow over the entire surface in one unbroken wave; then a short quick undulating motion must be given, so as to keep the mass of fluid on the plate, waving to and fro, and cause the silver solution which is in and upon the film to mix and blend with the iron solution, and thus obtain a uniform action on every part.

If on the application of the developing fluid there are indications of over exposure, stopping the development at an earlier stage than would



be proper in case of right exposure will in some degree counteract the mistake. A want of detail, where detail should be rendered, or excessive faintness in the detail of the shades, joined with full opacity of the high lights, are indications of under exposure: the prints from an under exposed negative would be hard, and wanting in half-tone. Over exposure produces a too general and equable deposit of silver over the entire film, the deep shades become veiled, even without long-continued developing, and the different gradations of light, which have acted upon the different parts of the film, are not represented by a corresponding variation in opacity in the different parts, but appear too uniform. In a print from a negative of this kind there will be excess of half-tone,—that is, those parts of the picture which should be rendered dark, with the details faintly shown, are unduly light,—black drapery appearing as if grey, and the picture altogether destitute of vigour. When the negative is dry, it should be varnished with a hard varnish, such as Soehnée's, or Anthony's Flint Varnish.

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### CHAPTER III.

## DIRECT NEGATIVE PROCESS.

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**T**HIS plan is still followed by a few operators who excel in it; but for portraits, we think we have said sufficient on the other process to make it more generally adopted, owing to its greater quickness, &c. For views, copying, &c., the direct method is still generally used. As the details for taking positives are nearly the same for this process, we shall only give such additional directions as the difference in manipulation requires. Patent plate should be used for this process also. The silver solution should be stronger than for positives.

Purest Nitrate Silver	. 35 grains (in winter 40 grains.)
Distilled Water	. . . 1 ounce.

To be iodized in the same manner as for positives. To be made only

slightly acid, by the addition of a few drops of acetic acid. The plate should be allowed a little longer time in the bath than for a positive; the exposure will be about twice as long. The developer should be;—

Pyrogallie Acid . . . . .	2 grains.
Glacial Acetic Acid . . . . .	10 drops.
Alcohol . . . . .	10 drops.
Distilled Water . . . . .	1 ounce.

This solution will not keep longer than a week; therefore it should not be prepared in large quantities. The developer should be modified to suit the weather,—in cold weather, as much as three grains of pyrogallie acid may be used; and in summer it may be reduced to one grain. The picture should be developed with this until all the details are brought out, with little intensity; then pour back into the developing glass, and add a few drops of silver solution (twenty grains to the ounce,) stir with a glass rod, and pour again over the picture. The image will now rapidly gain in intensity. It is best to push the development a little farther than necessary, as it loses a little of its intensity in the fixing bath. Fix with a saturated solution of hyposulphite of soda, in preference to cyanide of potassium; wash well, dry, and varnish the plate with a good spirit varnish, which will not crack. The best varnishes for negatives we have used, are the French Varnish of Soehnée Frères, and Anthony's Flint Varnish.

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#### CHAPTER IV.

### INSTANTANEOUS NEGATIVE PROCESS.

**I**T is generally admitted that nearly all kinds of photographic pictures, and more especially landscapes, would be immensely improved if they could be secured by an *instantaneous* process. Thus far, however, it has been found impracticable, in a room artistically lighted and with due attention to the arrangement of light and shade on the sitter, to secure portraits in less time than from 3 or 4 up to 60 seconds and more, according to the



purity of the atmosphere and quality of the light; whilst large landscapes can seldom be produced satisfactorily with a shorter exposure than 10 seconds, a space of time—though short really—yet sufficiently long to rob the picture of all those beautiful atmospheric effects so much admired in well known instantaneous productions.

It follows therefore, that all, or nearly all the so called “instantaneous” photographs are produced on plates not exceeding 8 inches by 6, whilst by far the greater number do not exceed the large stereoscopic size, viz.:  $5 \times 4$ . It is an erroneous opinion frequently held that success in instantaneous photography is due to some carefully guarded secret. On the contrary, however, secret dodges have little to do with the matter, and it will be generally found that those fortunate possessors of important and valuable wrinkles profit so little by them that they may generally be held up as photographic scarecrows, and are useful, therefore, only to point out what to avoid. Success in photography, and more especially in instantaneous photography, is not due to hidden secrets, but to untiring patience, and to care in the perfecting of all the various methods already in use. Pending the arrival of the photographic millenium—when the chemistry and optics of photography shall be so perfect that landscapes can be produced with the natural hues and atmospheric effects incident to the scene faithfully rendered,—we can only go on the beaten track, and he is a benefactor who repairs the road by the way. The object of the writer of these remarks is not to propound anything new, for, unfortunately, he is not a royal road maker, but to briefly describe his method of working, hoping it may smooth the path of some who may be doubtful of the way. He does not purpose to go through all the minor details which will be found in the previous pages of this manual, but only those points of importance which need attention to ensure success.

To begin with, bromo-iodized collodion is absolutely necessary. It is true that under certain circumstances, by no means under control, very rapid pictures can be obtained by the use of iodized collodion and pyrogallic developer, but when due account is taken of the uncertainty, and more than all, the difficulty of procuring perfectly clean pictures, free from comets and blemishes, it will not be advisable to waste any time in experiment in this direction, at least, not until perfect success has

been achieved by the employment of bromo-iodized collodion and iron development.

The bath should contain 40 grains of nitrate of silver, to 1 ounce of water, and is prepared by dissolving the nitrate of silver, (which should be re-crystallized and the best that can be bought,) in a small quantity of water. Now add to it a few grains of iodide of potassium, well stir, and afterwards add the remainder of the water. In most cases filtering would complete the operation, and we should have a bath in perfect order. But, as the payment of a good price will not always ensure a good article, and as in instantaneous photography success is due to attention to trifles, I always assume that the silver *may* be acid, or that it *may* have been some time in paper, or that some organic impurity *may* have sullied some unfortunate crystal, and therefore to be sure, I add a small quantity of carbonate of soda, shake well, and let the solution stand for some hours. I then filter and try a plate. The result is generally a picture veiled and streaky, but the addition, however, of 2 or 3 drops of very weak acid will make all right, and I have a bath in the most perfect condition for instantaneous operations. This bath is, however, in such a nicely balanced state that, with some collodions, it might be necessary to add a little more acid. A better plan however, especially if the collodion be colourless, will be to add 2 or 3 drops of tincture of iodine to the collodion until it assumes a deep straw colour.

A bath prepared as above will not retain its exalted state of sensitiveness very long, especially if many plates are immersed in it. A fortnight will be about the longest period that such a bath will act graciously, and then will follow fits of fickleness and waywardness, perplexing enough to the operator. It will, however, be found a capital bath for all ordinary purposes.

I will here mention a plan I adopt with old baths, which has been followed by complete success, where the accumulation of ether and alcohol in them has been considerable. The bath, having previously added to it a small quantity of carbonate of soda and shaken it well, is poured into a flat porcelain dish and placed in the kitchen oven. In this warm abode it is allowed to remain until the quantity is reduced to about a fourth. It is now permitted to cool, when the strength is tested by a silver meter,



and a sufficient quantity of distilled water added to make it up to its original strength. After filtering, the bath will be found in splendid condition, giving negatives with iron development that will require no intensification, and it will rarely need the addition of any acid. Since I have adopted this plan I have never known the trouble of a sickly bath. It will always be found unwise to add new silver to an old bath, in any quantity, without further treatment, therefore the best plan will be to add, first, a small quantity of carbonate of soda, then add the fresh silver solution, shake well and filter, when the bath will be quite fresh again and will generally work well without acid.

For instantaneous pictures it is best to employ a strong developing solution. The strength I would recommend is :—

Proto-sulphate of Iron . . . . .	30 grains.
Glacial Acetic Acid . . . . .	15 minims.
Water . . . . .	1 ounce.
Alcohol when necessary.	

In out-door operations, especially in a tent or through the sleeves of a dark box, much difficulty will be found in applying strong developing solutions to the plate, but patience and much practice will overcome it. Always have a measure sufficiently large, and do not be afraid of wasting a little solution. Carry the developer over the plate with one steady sweep of the hand, and, without the slightest hesitation, by a dexterous movement of the hand holding the plate, vigorously impel the solution backwards and forwards, and be sure that it penetrates the corners, as the middle of the plate is sure to take care of itself. This is the most important operation of all, for the slightest pause or indecision will cause a fatal stain, and in these instantaneous studies, unlike other pictures, no "doctoring" will avail, for in a picture where every fleecy cloud is rendered, any stain is at once apparent.

In the early times, when two-thirds of the picture was white paper and called by courtesy "sky," these ugly stains in the negative caused no anxiety to the mind of the operator, for he had good friends in Indian ink or dead black varnish; but now it is otherwise, and perhaps one reason why there are so few really good instantaneous pictures is, that very few indeed are able to develop a plate perfectly in the dark tent, with all its accompanying evils of heat, dust, and general botheration.

Be careful to develope until all the details are well out, and do not be in a hurry, for there is more to be brought out by prolonged action of iron developer than is generally known, and besides, it saves much time in the after intensification. The plate should now be washed, and if time be valuable—as, towards sunset, it too frequently is—when the sun looks in a hurry to retire for the evening, and when grand and ever changing clouds are rapidly travelling over his face,—then quickly fix the picture with cyanide of potassium, and well wash again, and store away in the plate box for further operations, to be performed at leisure. Should, however, the operator desire to finish the negative on the spot, then, after washing, and before fixing, let him intensify with pyrogallic acid and silver, or better still, use a re-developing solution made as follows:—

Protosulphate of Iron	. . . . .	5 grains.
Citric Acid	. . . . .	10 grains.
Water	. . . . .	1 ounce.

Take of this as much as is needed and add a few drops of nitrate of silver solution (not bath.) Pour this on and off the plate until the requisite intensity is obtained; then well wash, and fix with cyanide of potassium or hyposulphite of soda at will. Those plates that have been fixed but not intensified should be dried, and then a saturated solution of bichloride of mercury should be poured over the plate, previously taking care to well wet it first. The plate should be well washed, and then a very weak solution of iodide of potassium should follow, pouring it on and off a few times until dense enough. Care must be taken not to have this solution too strong, for otherwise the negative will be hopelessly ruined. Two grains to the ounce of water is the greatest strength that should be used, but generally one grain to the ounce of water will be found the best strength. Negatives thus intensified should not be allowed to dry spontaneously, as frequently stains form in drying, especially at the bottom where there is the greatest moisture. The application of gentle heat soon dries them, but they should not be made too hot and should be varnished out of hand.

I prefer a dark box with sleeves to a tent where the plates not larger than  $8\frac{1}{2}$  by  $6\frac{1}{2}$  are in use, for in hot weather dust is so troublesome, and it is almost impossible to creep into a tent without raising about your head,



and more especially your plate, a cloud of spiteful little particles, brim full of venom and spleen apparently, for they *will* visit the choicest and most important parts of your picture.

The best remedy against the inroads of dust—the photographer's deadliest though tiniest enemy—is the liberal use of a wet sponge everywhere, in the camera and slide, and particularly in the dark box or tent. Never dream of commencing the operations of the day without employing this most necessary precaution.

One great obstacle in instantaneous operations is the difficulty of procuring yellow glass for the windows that is really non-actinic, for it frequently happens that the glass that answers well for the window of the operating room where the development takes place, two or three feet away from it, is quite useless for the dark tent or box where the operations are carried on within a few inches of the window. Many failures undiscovered for months are due to this evil, for frequently the negatives are not absolutely spoiled, but there is an indescribable *something* about them that disappoints you, and the bath, and more especially the collodion are blamed, whilst the real cause goes unsuspected.

For ordinary cloud and sea effects the rapid removal and replacement of the focussing cloth will be found sufficient, but where very busy street pictures are attempted some other contrivance will be needed. The one used by me is placed in the camera, and is so arranged as to give a longer exposure to the foreground than to the sky. A brass rod passes through the top of the camera, somewhat like the piston of a cornet, and the rapidity of the exposure is regulated by the amount of pressure put upon the rod. This contrivance in the camera, though extremely easy in use, is rather complex in construction, and therefore difficult to describe, and cannot be made clear even with diagrams.

The photographic plodder would do well to read and study all the text books on composition of light and shade.\* He will soon find that it has not been time ill-spent; for the result will be an enlarged sphere of observation. Objects apparently too commonplace and trivial will be eagerly seized to aid in giving force to his pictures, and more than all, the

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\* See Chapter on the "Æsthetics of Photography."

eye will at once distinguish and separate those cloud effects that are beautiful in form from those that derive all their charms from the gorgeousness of their colour,—aknowledge particularly needed in working for sunset effects, and which will save him many disappointing failures. In conclusion, I would emphatically impress upon the ardent photographic student the necessity of coolness and deliberation, for the practice of these very necessary qualities will frequently save him the heart-ache. The excitement felt in securing a series of grand and rapidly-changing clouds, especially towards sunset, is very like that attendant upon salmon fishing; and, as in that very interesting occupation, the steadiest hand and coolest head carry off most booty. Finally, carry out with you each day an inexhaustible supply of that most indispensable photographic requisite, patience. Without it nothing really good will be done.\*

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## CHAPTER V.

### PRINTING ON PAPER.

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**T**HE term *Printing*, in Photography, means—the production of copies on paper, from the negatives, which we have shown how to produce. Two kinds of paper are used for this purpose,—the albumenized and salted papers. The albumenized paper has a gloss imparted to it by albumen, which makes it generally preferred for small pictures; for larger pictures the plain salted papers are more suitable, and much more artistic.

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\* We are indebted for this chapter to Mr. V. BLANCHARD, whose extensive experience and well known successful pictures give to his remarks great authority.



## ARTICLES REQUIRED IN PRINTING PROCESS :—

PRINTING FRAMES.  
 AGENTOMETER.  
 SILVER SOLUTION (60 to 80 grains to the ounce.)  
 CHLORIDE OF GOLD.  
 HYPOSULPHITE OF SODA.  
 ALBUMENIZED OR SALTED PAPER.  
 KAOLIN.  
 ACETATE OF SODA.  
 NITRATE OF SODA.  
 PURE CARBONATE OF SODA.  
 GLASS AND PORCELAIN DISHES.  
 AMERICAN PAPER CLIPS.  
 HORN FORCEPS.

## 1.—PRINTING ON ALBUMENIZED PAPER.

The albumenized paper had better be purchased, as it is not easy to prepare in small quantities. There are two kinds of this paper in the market, known as the Rive and Saxe. The Rive is a French paper, is thin, has a high glaze, and a fine surface; and is, therefore, the most suitable for small pictures, such as Cartes de Visite or Stereographs, &c. The Saxe paper is thicker, and is more suitable for large pictures.\* A new kind of Rive paper is now in the market, which has different shades of rose and mauve colour imparted to it. The manipulation is the same with each kind. This paper answers admirably for vignette portraits; for others we do not like it so well. We would draw the attention of photographers to the importance of procuring their albumenized paper in the *unrolled* state, as it has many advantages over the rolled,—viz., greater freedom from metallic spots, owing to not having passed through metal rollers, and greater stability of the glazing. From the surface not being “got up” to such a high state, it loses less in the washing, so that all the glaze which is found on the rolled paper, before being washed, is produced on this paper after washing, by being hot-pressed. It behaves a little differently on the silver bath; but this is soon understood, and the silver bath can be kept clear, after using, for months.

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\* There is also a *thin* Saxe paper used by some photographers in preference to Rive. There is no accounting for these preferences.

(1.) HOW TO SENSITIZE THE PAPER.—Make a solution of nitrate of silver (sixty grains to one ounce.) The triple silver is not needed for printing purposes: the ordinary crystallized answering as well. We prefer the bath made of ordinary water, as it sometimes prevents the paper from discolouring, and allows it to be kept longer. We do not say all waters will do so, but those we have tried will; in cases where good soft water is not to be had, use distilled. No addition is needed to this silver bath except a few drops of acetic acid.

We can confidently recommend a sensitizing solution made with—

Nitrate of Silver	. . . . .	40 grains.
Nitrate of Soda	. . . . .	40 grains.
Distilled Water	. . . . .	1 ounce.

The paper should be floated on this for five minutes. The addition of the nitrate of soda prevents the albumen from becoming dissolved from the paper, as is sometimes the case,—it does not allow the solution to penetrate the body of the paper, thus keeping the print brilliantly on the surface,—and it enables a weaker solution of nitrate of silver to be used to produce results equal to those of a stronger solution.\*

A glass or porcelain dish having been filled to the depth of half an inch with the sixty grain solution, or the soda-silver solution, have your albumenized paper cut to the suitable size, and lay it glazed side downwards on this bath. After floating about a minute, raise it up by one corner with the horn forceps, to see if there be any air bubbles; if so, remove them by blowing on them, replace the paper on the bath, and let it remain two minutes to four minutes longer. An egg glass is a very useful instrument to give the time on the bath. Now take up the paper by one corner, and allow it to drain, taking care no silver solution gets on the back, and hang it up by one of the American pegs to dry. Of course all this must be done in the dark-room, or by candlelight. With some kinds of albumenized paper, the silver bath will discolour after being used a few times. In this case, put about one-third of an ounce of kaolin into a pint bottle of solution, shake well, allow to settle, and the silver solution will be left clear. If you keep more solution than is required for the dish, the kaolin may be left in the bottle, and will keep

\* Of course the floating argentometer must not be used in estimating the amount of nitrate of silver in this solution.



it clear ; if not, it should be filtered before using. When the paper is dry, take a printing-frame, and moving the back, lay the negative on the glass of the frame, varnished side upwards. Some printing-frames are now used without glasses, which answer very well for small pictures. You next lay on the negative a piece of prepared paper, sensitive side downwards, put on the back of the printing-frame, and turn the bars across, to bring the paper and negative into close contact, and then expose to the light. The time required for printing will vary according to the actinic force of the sun's rays and the density of the negative,—an iron negative prints much quicker than a direct negative. The progress of the print can be easily examined by means of the jointed back, by lifting up one half of it, without disturbing the other. The print should be kept in the light till it is a little darker than desired, as it loses much in the subsequent processes. If you are printing a number, you may put them, as they are printed, into a book or drawer, and tone them altogether. When all are printed, put them into a deep porcelain dish filled with water, and let them remain fifteen minutes ; then throw off the water, and rinse them two or three times in fresh water till all milkiness has disappeared. This can be more readily done by rinsing the prints in a weak solution of common salt, and then washing again in clean water ; this, however, has a tendency to lower the tone somewhat. We prefer the plan of placing the prints in a solution of acetate of soda (one ounce to the pint,) which ensures all the chloride being destroyed. They may remain in this bath from five to twenty minutes, as we have found no difference from the length of time, and may be taken from this bath to the toning bath, without washing. There are so many different formulæ for the toning bath, all of which are good with some kinds of paper, that we shall keep to our rule, and only mention one here which is very much used ; for those who do not find it to answer, we refer them to a number of others in the Chapter on Formulæ.

The strength of the silver solution should be varied according to the density of the negative,—a weak feeble negative should be printed on paper sensitized with a strong solution of nitrate of silver,—and a vigorous dense negative, from paper prepared with a weaker solution. By regulating the strength of the silver bath in this way, many negatives may be made to yield much finer prints than if one uniform rule be followed.

We believe a great deal of the difficulty which is found in the toning baths now used arises from many photographers not thoroughly understanding how to use test papers, or the terms *Acid* and *Alkaline*. We will, therefore, although digressing a little, give some information respecting them. There are two kinds of litmus paper used, red and blue (which, by-the-by, should always be kept in good corked bottles, or they will become useless for testing;) all solutions that turn the blue paper pink on immersion, are termed *Acid*. In some cases this will not take place at once, but the paper will have to remain in the solution at least an hour before the pink colour is produced,—of course this is when the solution is only slightly acid;—the strength of the acidity, then, may be reckoned on the degree of redness given to the blue test-paper. Solutions which turn the red litmus paper blue, or which restore the colour to a piece of blue paper which has been turned red by acid, are said to be *Alkaline*. When it changes neither the red paper blue nor the blue paper red, it is termed neutral.

The processes of toning at present followed are the alkaline and neutral; the one we are about to describe is a neutral one, although we are inclined to think it works better slightly alkaline. Dissolve one ounce of acetate of soda in twenty ounces of distilled water; next dissolve fifteen grains of chloride of gold in fifteen ounces of distilled water, test this latter solution with blue test paper, and if it turn red, as it generally will do, add a few drops of a solution of pure carbonate of soda, until it does not change the paper red, then pour it into the solution of acetate of soda, shake well, and in a few hours it is ready for use;—this is the toning solution. The advantage of this solution is that it will keep, and can be used over and over again, whereas the carbonate and phosphate solutions will not. When this solution has been used for toning pictures, it should be slightly acidulated with hydrochloric acid, before putting away;—and when required for use again, this acid should be neutralized with solution of pure carbonate of soda. The toning properties are thus kept longer unimpaired, and the gold which is taken out by the prints can be at any time renewed by adding a little of the neutralized solution of chloride of gold\*

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\* It will be found a good plan to keep chloride of gold in a solution of the strength of 1 grain to a drachm of distilled water, so that any fraction of a grain can be used by taking the proper quantity of the solution.



as required. This solution should be poured into a porcelain dish, and a number of prints placed in it,—they require watching, and turning over now and then, to prevent them toning unequally; if any appear not to tone in places, the finger gently rubbed over the part will usually remedy this. The time to remain in this bath will depend on the temperature,—in warm weather two to four minutes will be sufficient,—in cold weather ten to fifteen. You may tone them quicker in cold weather by placing the dish on a stove or water-bath, and raising the temperature to about 120°. The principal difficulty in toning is to judge whether they have been toned sufficiently or not,—experience alone can be a sure guide. You require to rather overtone, as they are lowered in the fixing solution, but be careful this is not too much, or the prints will be flat and inky. All prints will not tone alike, therefore it is the best to have another dish of water at hand, and as they are toned to place them in it. When all are toned, rinse in water, and place in the fixing bath,—

Hyposulphite of Soda . . . . .	1 ounce.
Water . . . . .	6 ounces.

The prints will lose much of their colour in this bath, and change to somewhat of a brown; but they regain their colour again before they are fixed, or if not, in the subsequent drying. Many amateurs spoil their pictures by not letting them remain long enough in the fixing solution to regain their colour, so that they always obtain a foxy-brown tone. Fifteen minutes is about the usual time required for fixing, although they should not be timed, but judged by their appearance. If any yellow patches are seen in the light parts on looking through them, they are not fixed enough.

A piece of chalk should always be kept in the fixing solution, to neutralize any acidity, and a fresh solution of hyposulphite of soda should be made for every separate batch of prints. It is also worth knowing, that if the prints remain in water an hour or so after toning, they will not be lowered in tone in the fixing solution to such an extent as if immersed immediately after toning.

After fixing, they require to be well washed in a plentiful supply of water, remembering that it is not the length of time they are in the water that cleanses them, but the number of times it is renewed. The best plan to wash them is to place them in one of the deep washing

dishes made for the purpose, which has a hole in one corner to allow the water to escape, or one having a syphon formed in the side, by which the under water is carried off as the fresh is put in. They should be placed over a sink, where the water from a tap can play upon them. When dry, they are mounted on cards, &c.. The best medium for mounting is Dextrine or starch, dissolved in warm water.

As the permanency of paper photographs is a matter of the greatest importance, it is evidently desirable that every trace of hyposulphite of soda, the salt whose presence prevents permanence, should be entirely got rid of. Hence the necessity of the *thorough* washing of paper prints after fixing. When this washing is enough, i.e., when all the hyposulphite of soda is washed away, is a point that should be accurately determined. We consider that if the water in which a batch of prints has been *soaking* and *stirred about* during a half-an-hour, will stand the following test, the absence of all hyposulphite of soda may be considered as *practically* certain.

Have ready prepared two solutions—one a weak solution of iodine in distilled water—the other a weak solution of starch in distilled water. This latter should be *freshly* prepared by boiling about 5 grains of starch in a test tube or evaporating dish, with an ounce or so of distilled water. To use this test, put 10 drops of the starch solution into a test tube with two drops of the iodine solution—a blue colour is produced—add some of the water in which the prints have been soaking, and if hyposulphite of soda be present the blue colour will disappear. To observe this better, hold the test tube between the eye and a sheet of white paper. If the blue colour remains, the prints may be considered as washed enough, as this test will detect 1 grain of hyposulphite of soda in  $2\frac{1}{4}$  gallons of water. We are indebted to an article in the *British Journal of Photography* for the particular mode of application of this well known test.

## 2.—PRINTING ON SALTED PAPER.

Printing on salted paper is adopted for large views, or portraits of a large size which are to be finished in sepia, as the surface is better for colouring upon. The paper may be procured ready salted, or in the



plain state, in the latter case it should be immersed three or four minutes in the following:—

Chloride of Ammonium . . . . .	100 grains.
Chloride of Barium . . . . .	100 grains.
Citrate of Soda . . . . .	20 grains.
Water . . . . .	20 ounces.

This may be done in daylight. When dry, the sheets are sensitized on the usual printing-bath, sixty grains to the ounce. A salted paper prepared and sized with arrowroot, we have found to give excellent results. If small quantities of plain paper only are used, they may be toned in the toning bath already described for albumenized paper; but if many are used we should recommend the process of M. Disderi, which is admirable for the arrowroot paper, and may be used equally well for all salted papers.\*

After taking the prints from the printing-frame, put them quickly into the following bath:—

Water . . . . .	10 ounces.
Chloride of Sodium . . . . .	$\frac{1}{2}$ ounce.

After one or two minutes, remove them into the following:—

Water . . . . .	10 ounces.
Chloride of Gold . . . . .	8 grains.
Chloride of Sodium . . . . .	$\frac{1}{2}$ ounce.

Wash, and then plunge into the following bath:—

Water . . . . .	10 ounces.
Hyposulphite of Soda . . . . .	$1\frac{1}{2}$ ounce.
Bicarbonate Soda. . . . .	12 grains.

Let them remain in this bath about half an hour, then wash thoroughly. The tone obtained by this method is warm, the whites are clear, and the shadows possess great vigour.

### 3.—PRINTING ON THE ENAMEL OR PORCELAIN PAPER.

This enamel paper has a beautifully smooth outer coating which completely conceals the grain of the paper underneath. For subjects

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\* There are various makes of salted paper—one kind suits one operator better than another—as with albumenized papers. It should be a photographer's motto with regard to the paper he can use the best, "When found, stick to it."

requiring fine detail and exquisite sharpness of outline, there is no paper made that will equal the enamel paper, as its surface resembles glass rather than albumen. It has, however, some drawbacks in its use, which may prevent its general adoption for *all* classes of photographs. The bright surface is objectionable for many subjects,—the degree of uncertainty as to the perfection of *every* sheet is sometimes annoying, and the extra care required in manipulation will prevent its superseding albumenized paper, where *quantity* is of more importance than *quality*. Still a careful operator, by choosing his subject, and selecting his prints, will produce results on enamel paper that cannot be surpassed for beauty and tone. We just introduced this article as the last edition of our “Universal Text Book” was going to press, since then we have had much experience respecting it, and these remarks are the results. Unfortunately for the credit of this paper, a make was introduced into England previously to ours, which was so unmanageable that it brought enamel paper generally into an undeserved disrepute. We would advise all who have been disappointed to again try this paper, as we are convinced that, with the precautions we have named, and attention to the following directions, good results are attainable. In the first place, do not keep the stock of paper too dry; after exciting do not let it dry too much, when trimming the prints after fixing and washing, cut them damp and finally mount them damp. To excite this paper float a sheet for five minutes on a bath composed of

Nitrate of Silver	. . . . .	80 grains.
Distilled Water	. . . . .	1 ounce.
Citric Acid	. . . . .	1 grain.

Dry carefully, but not *too* highly, in a place free from dust. Pin the sheet up at the four corners on a board, thus :—the bottom corner projecting a little over the edge of the board, so that the superfluous silver solution may be collected. Print till the shadows are bronzed, then wash and tone as for albumenized paper, by any favourite formula. Fix in fresh solution of Hyposulphite of Soda, 4 ounces to 32 ounces of water, with 2 ounces of carbonate of soda, dissolved in the solution.





## CHAPTER VI.

## PHOTODIAPHANIE.

**T**HIS is a name we have given to a process similar to the foregoing on paper, but differing in this important respect ; the albumen film can be detached from the sheet of paper in Photodiaphanie, whilst it is fixed to the paper in all the other processes. The advantages of this peculiarity are self-evident,—the beautifully delicate film on which the photograph has been printed can be applied to articles with carved and irregular surfaces, such as vases, jars, bronzes, and many other articles of ornament, as well as the carved glasses of brooches, locketts, &c. As a new mode of ornamenting windows, hand screens, and producing the lovely transparencies upon opaline and “ivory glass,” it is capable of great application.

The editor of the *British Journal of Photography*, speaking of this process says,—

“Messrs. HARVEY, REYNOLDS, and FOWLER, of Leeds, have recently introduced to this country a new and ingenious process of transferring photographs from the paper on which they are printed, which will open out numerous fresh applications of the art in industrial and ornamental directions.

“Photographic transparencies are certainly the most beautiful, truthful, and pleasing of all the art’s productions. Subtle tints and shades, lost in the ordinary paper proof, and even but partially effective in the more delicate gradations of the glass positive or silver-surfaced Daguerreotype, become apparent in the transparency, giving that degree of delicacy, roundness, and beauty which, once seen, must be appreciated ; and we therefore prophecy that the new process will become exceedingly popular, not only amongst the professors of photography, but also amongst a class to whom the operations of our art are now strange and unknown. A new description of photographic amateurs will probably arise in the shape of those who have resigned the sticky-trifling-manias and other silly modes of wasting time, now popular amongst ladies, for the more profitable and sensible amusement of photodiaphanie.

“For portraiture, when the film is transferred to the smooth surface of marble or white enamel glass, or the artist’s prepared ivory, very beautiful results will be obtained, and the pictures may then be coloured to resemble the very finest productions of miniature painting’s best days.”

The editor of the *Photographic News* suggests another use for these diaphanous films, viz., that they afford a good means for solving many of

the problems respecting the theory of the photographic image, and we think this suggestion is well worthy of the attention of experimentalists in that direction.

We have received many letters upon this process, and several have appeared in the Photographic periodicals respecting it. The experiments of our friends coincide very much with our own, and we would here acknowledge the liberality of those who have privately and publicly published the results of their labours. It is only in this way that the value of the new process can be established, and we shall be amply satisfied for all the trouble and expense of the first introduction of Photodiaphanie into this country, if it becomes as popular as it deserves to be. The paper is similar in appearance, &c., to highly albumenized paper; it is to be sensitized in the same way, and must not be too highly dried after this process, or the transferred film may be full of minute cracks, &c. The exposure in the pressure frame must be *much greater* than with albumenized paper, it must be continued not only till the *shadows* are bronzed, but till the *lights* are turning brown. The necessity for this overprinting will be seen by the great loss of color of the *transparent* photographs in the fixing solution; and one of the reasons for it is to print *through* the film, so that the picture shall be on both sides; this is seen by the impression upon the paper from which the film separates, which is so clear that it may be used as a photograph on plain salted paper. After printing, the prints should be trimmed to the desired shape, as it is troublesome to cut the diaphanous photograph when it has left the paper. Now wash and tone as usual, only be careful in toning not to over do it, or inky colours will be obtained in the finished photograph. This is easy to avoid in pictures on albumenized paper,—but on this, where the picture is much *over printed*, the gradations of toning are not so visible. Practice will only determine the proper point. In the washing, after toning, and in the fixing solution, the film begins to separate from the paper,—and here is all the real difficulty of the process. Careful manipulation and patience will, however, conquer. When the film floats off the paper, to assist which, a little gentle coaxing is sometimes required, it should be placed in the fixing solution if it comes off in the previous washing,—or, if fixed, it should be put into a dish of water. After freeing it from all trace of hyposulphite of soda, let it remain in a dish



of water for 12 hours, in order to become tough and more easy to transfer; of course a delicate film cannot be put from one dish to another and pulled about like a sheet of paper; it must have more gentle attentions, and the aid of a piece of glass with all sharp edges removed, or a broad camel's hair brush, or an ivory paper cutter will be found useful. It is just the kind of work for ladies, requiring that delicate fingering manipulation, in which they excel.

Now, supposing the film to be washed and ready for transferring, to accomplish this perfectly, the object on which the photograph is to be fixed must be THOROUGHLY CLEANED and free from grease, &c. It is then placed in the water underneath the floating film, and gently raised out with the photograph adhering to its surface. The film is pulled into the proper position, and when dry, may be protected with any hard transparent varnish. If it should be found that the film does not adhere closely to round or oval surfaces, wash it over (without removing it) with a mixture of

Glacial Acetic Acid, 32° . . . . .	1 ounce
Distilled Water . . . . .	6 ounces

This causes the film to become elastic, and as soon as it is sufficiently so to adhere well, wash it with distilled water to remove all acid.

It may not be always possible to put the article on which the film is to be fixed under water; in these cases carefully lift the film by adhesion to a flat soft camel's hair brush, and by dexterous management lay it on the object, pressing it gently down. These photographs can be coloured with oil and water colors, or the transparent colors used by painters of magic lantern slides, &c. A beautiful effect may be produced by transferring one of these photographs on a curved locket or brooch glass, and when colored and varnished, pouring over a thick cream of very fine and white plaster of Paris, this will soon set hard, and will produce the effect of an enamelled miniature. The effect may be varied by tinting the plaster of Paris with carmine, ultramarine, &c.; and by allowing it to absorb, melted white wax. The films with the photographs can also be burnt in glass or porcelain, to which they are attached, and thus a large field is opened for enterprise in ornamenting china ornaments, dishes, &c., and glass for lamps, windows, conservatories, &c.

The two following letters appeared in the *Photographic News* respecting

Photodiaphanie, and as they contain useful hints as to its manipulation, &c., we take the liberty to reprint them here.

"Dear Sir,—Can you or any of your correspondents inform me how to make or procure a good opal varnish? Perhaps I ought to state the use I wish to make of it. It is this—to coat a curved glass with it, either before or after an albumen film has been transferred on it (the glass) by the new process, as I think that for brooches, &c., Photodiaphanie will prove almost invaluable. In the comparatively few experiments I have made with this process, I have found that, upon removing the print from the hypo, the *surface* on no account should be touched, as the film is so exceedingly tender that it is sure to tear if meddled with and when the print has been trimmed to the proper shape, of course it is spoiled by the least tearing or abrasion of the edge. The best way to remove it is to slip a plate of glass underneath. As soon as the print is placed in water, the film separates; it must now be left untouched for about half an hour, when it will have become tough, and may be carefully handled. The larger the quantity of water into which the print is first placed the better. I only made these notes for the benefit of those who are about to make their first attempt in this exceedingly elegant and fascinating process. Another thing that I found tiresome at first was the thorough washing of the film, which is absolutely necessary.

"The following was the most successful method—Have ready several large basins filled with water, one more than the number of prints to be transferred. Upon removing from the hypo (in which no more prints must be fixed at a time than will lay at the bottom of the dish without touching each other,) place *one print* in each basin, and, for the reason previously mentioned allow them to remain half an hour. Now have a dish of requisite size—if the print be very small a saucer will do—and with it remove one of the films into the basin containing clear water. Fill the basin from which it was removed with fresh water, and place one of the other films in it, and so on, till they are all thoroughly washed. Care must be taken not to pull the film too tightly across the article on which it is placed, or else, upon drying, it will be found to be full of minute cracks. This inconvenience will also be experienced if the film be not sufficiently washed. I give warning to all those who have not tried this process, that a great deal of patience will be required to bring it to a successful termination. I should like to see some fidgety, testy, old gentleman trying to catch a film in the right position on a curved piece of glass!

"Amateurs are sure to have several friends who think there is no trouble involved in photographic operations; it would be a capital plan to set them at photodiaphanie; they would soon discover their mistake. By the bye, that reminds me that if, when the film is dry, you find that it is not exactly in the position required, the best means to remove it are to place the article whereon it is in a vessel containing warm water, (about 120°,) and allow it to remain till it separates, when it may be caught again. I have found the addition of a little alcohol to the nitrate bath to be of great service in many ways.

"Some persons, upon reading these remarks, will, I daresay, exclaim that I have wasted a good deal of your valuable space upon trifling details; that every one, with any common sense, might find out for himself. My excuse, if any be required, is this—that it ought to be the endeavour of every photographer to save his brethren, who are about to try a new process, from failure, by describing the most trivial points of danger, as nothing is more disheartening to the novice than to find everything go right up to a certain point, and then a failure to occur from circumstances which the originators of the process have thought too unimportant to mention.

"Many valuable formulæ have, doubtless, been discarded from failure in the first instance, when, if more minute directions had been given, the primary success would have encouraged in any subsequent mishaps.

"I am dear Sir, yours truly,

"5 Aberdeen Park, October 12, 1863.

"H. COOPER, JUN."



"The film is easily placed on any part of a vase, if the following simple plan be adopted. Place the vase in a large vessel of water, lift the film out of the basin with a camel-hair brush, and place in the vessel containing the vase; now gently touch the film with the brush to make it float out flat on the top of the water, this may be done in two minutes. If now the point of the brush be placed in the centre of the film and the vase gently raised with the other hand under it, both may be brought out of the water without any tricks on the part of the film. It may be moved with the brush a considerable distance, if this is done directly it is taken out of the water.

"In washing, I do not find it necessary to use more than two basins for several films, as they may all be put into one basin whilst the water is being changed in the other. There is no fear of their hurting each other.

"I have been induced to make these remarks because I am very much pleased with the process, and find it very much more *simple* than I expected. It answers admirably for stereoscopic transparencies, which ought, therefore, to be produced much cheaper than they have hitherto been. Yours truly,

"Lower Goat Lane, Norwich.

"J. BURGESS."

We shall be glad to render every assistance to those who wish to experiment in this new process, and will place the paper at the disposal of any scientific gentleman who may wish to ascertain the composition of the photographic image, &c., by means of these delicate films.

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## CHAPTER VII.

# CARBON PRINTING.

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CARBON prints are produced from negatives in a similar manner to silver prints, that is by exposing the sensitive surface to light under a negative in the pressure frame, but the effect or action of the light is different, and the whole management of carbon is different from that of printing in silver. In silver printing, the surface of the paper is originally white, and it gradually becomes blackened under the influence of light; but in carbon printing the surface is blackened before exposure, and the effect of the light is to harden that surface, or soften it, according to the nature of the process employed. The picture is obtained by washing away such of the material as remains or becomes soluble.

There are various methods of printing in carbon and other permanent pigments, each of which has its peculiar merits, as well as disadvantages. In the following remarks we shall confine ourselves chiefly to the process on plain paper recently published in the *Photographic Notes*, by Mr. W. Blair, of Perth, which appears capable of producing good results under skilful manipulation.

The sensitive material used in this process is bichromate of potass. This substance, when incorporated with organic matter and exposed to light, becomes insoluble, or partially so, according to the length of exposure. The carbon is mixed with, or imbedded in, gelatine, albumen, or gum, to give it consistency and make it adhere to the paper, and the addition of bichromate renders it sensitive to the light.

It is evident that if a *thick* coating of this substance be laid upon paper, and exposed to light under a negative, an impression will be made on the outer or upper surface of the carbon, but in consequence of its opacity, that impression will scarcely reach the paper, at least through those parts of the negative which obstruct much light. Such an impression will be found, on washing, to have small adherence to the paper. Indeed it would quickly be undermined and washed away, or, at least, leave nothing remaining on the paper, but the deeper blacks at those places where the light had been sufficiently powerful to reach the paper. To get a picture with such a coating, the back of the paper must be turned to the negative, and the carbon sunned through the paper. The want of sufficient transparency, however, in common paper, which has neither been waxed nor varnished, renders the exposure necessarily long, and the resulting picture granular and coarse, and if transparency be obtained by varnishing or waxing, it is at the expense of brilliancy and force in the lights. The procedure in the following process is reversed, but certain expedients are resorted to, to prevent too much hardening on the surface, and secure the half-shades underneath.

#### FORMULÆ.

1.—Take a sheet of good white smooth paper, rather softly sized. Gelatinize it very evenly on one side with diluted hot gelatine, mixed with a little common salt, say three or four grains to the ounce.



Allow it to dry thoroughly in a place protected from dust. Treat your whole batch of paper in the same manner, so as to use up your gelatine while it is fresh.

2.—Take a quantity of albumen ; mix with it a very small quantity of what is commonly sold as “golden syrup,” or honey syrup, perhaps five or six drops to the ounce, also a little common salt, as used in the gelatine, and a little water. Rub down amongst this mixture as much of any fine transparent water colour, or mixture of colours to give the tone wanted, as will give a strong colour to the albumen ; let it be such that one layer of it with a brush upon paper will give a good depth of *middle* shade. Beat the whole well up into a froth, set aside to settle, and pour off the settled albumen into a small bottle for use. Now take one sheet at a time of the gelatinized paper, damp it slightly on the back by any convenient method to make it lie flat, and lay it on a sheet of glass or other smooth surface, with the gelatine side upwards. Pour a little of the coloured albumen on its surface, and spread it with a soft brush ; then with a painter’s broad hogs-hair “softener” sweep the surface gently in all directions, so as to produce a uniform coating of middle tone, carry any surplus over the edges with the brush, and leave off before the surface has dried to tackiness. As the half-shades of the picture are afterwards produced, chiefly out of this coating, the colouring matter should be very fine, and of an agreeable tone. The paper is again allowed to dry, and when dry should be put into a portfolio to flatten it. Avoid dust and broken bits of hair from the brushes as much as possible.

3.—The next step is to blacken the paper with carbon. Have some very finely subdivided dry carbon, or other dark non-metallic substance in a wide-mouthed bottle or dish. This, of course, is the substance out of which the deeper shades of the picture are afterwards obtained. To blacken the surface of the paper, proceed as follows :—Damp some blotting paper, press out the superabundant moisture and lay it on a suitable sized board. Then take a sheet of the prepared paper—damp it on the back quickly, but regularly, either with a sponge, or by laying it on a dish of water, avoiding air bubbles. Lay it, back down, on the damped blotting paper, and with a sheet of dry blotting paper placed above it, level it well down, so as to equalize the moisture and give a flat surface for the brush. Now pour on a little heap of dry carbon, and

*instantly* proceed to spread it regularly and rapidly over the surface with a soft camel-hair brush. Avoid touching the extreme edges of the paper, lest the brush catch any moisture. Collect the superfluous carbon towards one end, and return it to the bottle or dish. Then continue rubbing smoothly with the brush for a short time, partly to indent the adhering carbon into the albumen, and partly to clear off what is not adhering. The paper is now finally allowed to dry, and can be kept in stock for use.

The "Carbonizing," though apparently simple, is in fact, the most precarious part of the whole operation, for if too much time be expended before the carbon is spread, the surface may become too damp, and the carbon may adhere irregularly and too densely. Some paper, however, is much easier managed than others. It is not necessary that the surface should appear *densely* black. If made very dense, transparency is lost, and the success of the operation depends upon striking the proper medium. A certain amount of transparency is necessary to allow the light to penetrate well into the paper when exposed, in order to secure half tone, and a certain degree of blackness is necessary to secure vigour. The aim of the operator will, of course, be, as far as possible, to *combine* these results.

It may be mentioned here, as an additional security for obtaining the finer half tones, that the gelatinized surface may be softly tinted with any suitable water colour, and again allowed to dry before laying on the coloured albumen. In this case the last washings must be with very hot water to melt the gelatine and get into the pure whites. The gelatine should not be tinted *before* being laid on the paper, as, in that case, the colouring matter will, more or less, penetrate the paper itself, and it will be next to impossible to get pure whites without doing too much violence to the grain of the paper.

The next stages of the process are all simple, but require attention.

1.—Have a saturated solution of Bichromate of Potash, in two parts water, and one part common acetic acid. Upon a horizontal bath of this solution float the "carbonized" paper, back downwards, for half an hour or an hour, according to the texture and sizing of the paper—that is, until the Bichromate has well penetrated to the upper surface, which should



become damp, but should not be soaked. Then hang up to dry, of course in the dark.

2.—Expose in the pressure frame under a negative in the usual way. Place the blackened surface next the negative film. With a moderately dense negative, such as would make a vigorous silver print, expose in strong sunshine from 10 to 15 minutes. Direct sunshine appears to be best, and the correct time is easiest calculated. On opening the half of the back lid of the frame and looking through the paper against the yellow light of the operating room, a pretty distinct impression of a brownish hue should be visible, but not in the weaker details.

3.—The paper should now be immersed in cold or luke-warm water and brushed over on both sides to remove air bubbles. It may be allowed to soak for 10 or 15 minutes and should then be tried with a broad soft brush sweeping gently in all directions across the carbon. The bottom of the dish should be flat that the brush may press equally; and if it be of a white colour, the gradual appearance of the picture will be better observed. A good plan is to soak two pictures at a time with their white backs against each other. Turning the two at once, the dark surface of one of them is always uppermost ready for the brush. Should the picture be slow to clear up, gradually add warm water and return now and then to the brushing. Latterly, if necessary, you may use the water almost boiling, adding a little liquid ammonia; and if the picture does not then rapidly clear up, under the operation of the brush, and assume all the requisite gradations of shade, it must have been greatly over exposed. Last of all, if need be, a soft sponge may be tried instead of the brush, and, indeed, by the use of a sponge, details are sometimes brought up in the shadows that would not otherwise become visible. With some paper it is also necessary to use a sponge in order to get *pure* lights, but it has a tendency to weaken the deeper blacks. Give a last wash in clean water; hang up to dry, and the picture is finished. Of course a surface gloss may be afterwards given it, if desired, by pressure between rollers, or by varnishing, whereby, especially if the picture is small, its appearance may be improved.

In carbon printing the difficulty hitherto has been to obtain prints on plain paper, possessing softness in the middle shades, with sufficient density in the blacks. The above process however when successfully

managed seems to have considerable capabilities in this respect. Doubtless it may hardly compete in beauty with silver printing, especially on albumenized paper; and it has been remarked that there is a tendency to obscuration of the details of the negative in the deeper shadows. But it is submitted that this is a defect which to a great extent may be remedied. It is often attributable in some degree to the character of the negative used. Hitherto almost every one has been accustomed to take negatives merely for silver printing, and has been satisfied with such results as would come up to a certain standard in the printing process employed. To do justice to the carbon process, it is evident that negatives should be taken expressly for that purpose, and the details in the shadows should be firmly brought out. By the different processes of development now at command, negatives very different in their character may be taken from the same view or subject. The particular printing process which each Photographer has been accustomed to, has guided him in the development of his negatives, and should any one desire to print in carbon, he must just note what character of negative gives the best results by that process, and direct his aim accordingly. In this as in other matters, the different departments of the process must have a relative applicability to one another to produce the best results.

The reason why, in the process above described, carbon is not relied on for the finer half shades, but other more transparent colours substituted (which are simply overlaid with carbon to secure the deeper blacks,) is merely this, that although carbon, whether in the shape of charcoal, lamp black, drop black, or vegetable black, may theoretically be susceptible of infinite sub-division, in practice it will be found that some other substances well known to painters as very permanent colours, when ground down and mixed with water, approach much nearer the consistency of a transparent solution than any of these carbonaceous substances, and finer half shade (besides a variety of tint) can be got by the use of these colours, than by using carbon alone; and there is really no good reason why we should confine ourselves to carbon, if finer results and equally reliable for permanency, or nearly so, can be secured by a combination of other pigments—the desideratum being *good permanent impressions, by whatever process produced.*

Attention may be called here also to the New Carbon Process,



published by M. Poitevin in the *Bulletin Francais*, and copied into the *Photographic Notes* of 15th August, 1863. By this process a coating of carbon and gelatine is first put upon the paper and allowed to dry. The paper is then impregnated on both sides with a solution of perchloride of iron and tartaric acid, in the proportion of three to one. It is then allowed to dry in the dark, and becomes insoluble. When exposed to light, under a transparent *positive*, the parts affected by the light become soluble in warm water, and are washed away accordingly, leaving the unimpressed black coating on the paper. As the solubility commences at the surface, and penetrates just to the depth affected by the light, it appears possible by this process to obtain the various gradations of shade, and M. Poitevin has in this way corrected an error in the treatment of carbon, which rendered the process published by him in 1855 unworkable; but he does not say that he has yet got quite satisfactory results.

For a description of the new patented process of Mr. John Pouncy of Dorchester, by which fine photographic impressions in printer's ink are taken on varnished paper, by means of dissolved bitumen of Judea, we beg to refer our readers to the recent publication on that process by Thomas Sutton, Esq., B.A. As this process is patented, parties desirous of practising it would of course require to communicate with Mr. Pouncy; but we understand that the very long exposure required is a great drawback, and we believe that results not much inferior may be got on thin waxed paper by a simpler process, published in No. 77 of *Photographic Notes* for the year 1859.

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## CHAPTER VIII.

# DRY PROCESSES.

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OWING to the difficulties attendant upon taking all the apparatus we have described into the country for operating in the open air, many processes have been recommended by which the collodion plates may be prepared ready for exposure three or four weeks before they are required to be used. The advantage of such processes is manifest, for by using

a small portable camera, all that is necessary to take twelve or twenty-four views may be put into a small carpet-bag, as the developing and fixing may be delayed after exposure.

The general principle of all the dry processes is that a preservative coating, such as honey, tannin, resin, gum, syrups, &c., be added to the prepared silver plate.

We shall first describe the tannin process, as it can be recommended both for its simplicity and certainty.

### 1.—TANNIN PROCESS.

Cleaning the glasses should be made a special point in this process, for unless they are chemically clean, the film is sure to peel off in the subsequent washings. It will be sufficient for small glasses, if they be well cleaned, and their edges roughened by a file; but for larger plates, Major Russell (to whom we are indebted for this process) uses the following coating of gelatine, to be applied before the collodion:—

Gelatine . . . . .	5 grains.
Distilled Water . . . . .	1 ounce.
Glacial Acetic Acid . . . . .	5 drops.

When swelled and transparent, dissolve by placing the bottle in warm water, then add one drachm of alcohol to each ounce of solution, and filter two or three times through paper. Before using, warm the plates, and coat in the same way as collodion; drain and dry before a clear fire. Another plan which we have found to answer well, is to pour on the clean glass a small portion of the white of an egg and rub it well over the surface of the glass with a pellet of linen; this gives a very thin coating of albumen, which causes the collodion to adhere admirably. The collodion used for the tannin process should be bromo-iodized, and one that adheres well to the glass. The ordinary negative bath will do if slightly acid with acetic acid. The collodion should be allowed to "set" a little longer than in the wet process. On taking out of the silver bath, the plates should be well washed under a tap; and, if required to keep long, they should be soaked in water for half an hour to take out all traces of free nitrate of silver; then drain and pour on the following solution:—

Tannin . . . . .	15 grains.
Water . . . . .	1 ounce.



The strength of this solution will vary with the subject. It will keep two or three days. It is better to add a little alcohol, and it must be filtered before using. Allow it to flow backwards and forwards over the plate, so as to permeate the film; throw off and pour on a second quantity; drain and dry by artificial heat, or spontaneously.

The exposure should be eight or ten times as long as for wet plates. Before developing, the plate should be flooded with water, which should be allowed to remain until the blisters formed contract, (if the plates have been previously prepared with gelatine they will not blister,) then develop with

#### DEVELOPER No. 1.

Pyrogallic Acid	. . . . .	96 grains.
Absolute Alcohol	. . . . .	1 ounce.

Five minims of this contain one grain of Pyrogallic Acid.

#### DEVELOPER No. 2.

Nitrate of Silver	. . . . .	10 grains.
Citric Acid	. . . . .	10 to 30 grains.
Water	. . . . .	1 ounce.

Add one drop of No. 1 to three drachms of distilled water; filter and add one drop of No. 2; pour on and off several times. The picture develops nearly as quickly as in the wet process. If the image present itself slowly through under-exposure, add more of No. 1, drop by drop, and watch the effect. If, on the other hand, the image appears quickly, add more of No. 2. By the judicious use of these developers, a wide range may be given to the exposure without giving bad results. Wash well, and fix with hyposulphite of soda, not cyanide of potassium.

#### 2.—COLLODIO-ALBUMEN PROCESS.

Of this process we have had but little experience. It is not nearly so simple as the tannin process.

Nearly any kind of collodion will do, but that made at a high temperature is to be preferred. It is necessary in this, as well as in the other dry processes, that the pneumatic plate-holder should be used, to prevent stains, and get the negatives perfect to the edges. The silver bath is composed as follows:—

Triple Nitrate of Silver	.. . . .	40 grains.
Distilled Water	. . . . .	$\frac{1}{4}$ ounce.
Glacial Acetic Acid	. . . . .	30 minims.
Alcohol	. . . . .	10 minims.

To be saturated with iodide in the usual way. After the plate has been sensitized on this bath, wash freely in distilled water, drain closely, and while still wet, pour on the following :—

Chloride of Sodium . . . . .	15 grains.
Bromide of Potassium . . . . .	3 grains.
Distilled Water . . . . .	3 ounces.
Ammonia, '880 . . . . .	60 minims.
White of Egg . . . . .	6 ounces.

Mix, place in a large bottle, and shake to a froth. Allow it to stand twelve hours or more, and then filter through a piece of clean sponge placed in the neck of a funnel. Allow this to flow in a stream over the plate without stopping, keep it on for about half a minute, then drain closely, and place on edge to dry. The plate, finally, should be thoroughly dried by heat, either in front of a brisk fire, shaded, or by being placed for a short time in a moderately warm oven. The plates in this condition are not sensitive to light to any perceptible degree; and to render them so, have to be well warmed, immersed in the silver bath, and dried in a dark place. Before developing, the plates require to be moistened with water, then dip the plate in hot water, and pour on a hot three-grain solution of pyrogallic, and keep the plate in motion till all the details of the image appear, then use the ordinary negative developer, with a few drops of solution of nitrate of silver added. Fix in hyposulphite of soda.

### 3.—FOTHERGILL'S PROCESS.

Use Keene's collodion, and excite in a slightly acid thirty-five grain silver bath, and wash well; drain, and pour on the following solution :—

Albumen . . . . .	1 ounce.
Distilled Water . . . . .	9 ounces.
Chloride of Ammonium . . . . .	5 grains.

Allow this to soak well into the film, pour off, wash well, and dry. These plates will keep sensitive two or three months. They may be developed with either gallic or pyrogallic acid, and fixed with hyposulphite of soda.

### 4.—DISDERI'S DRY PROCESS.

The method here described M. Disderi says he has found the most easy and certain he has tried. Any bromo-iodized collodion will do;



and any good formula may be used for developing. We, however, give the literal translation of the process he follows. The plate is coated with collodion, and sensitized upon the following bath :—

Distilled Water . . . . .	10 ounces.
Nitrate of Silver (fused) . . . . .	5 drachms.
Glacial Acetic Acid, 50° . . . . .	50 minims.

Drain an instant, and plunge into a bath of distilled water, collodion side up. Agitate in this bath till it loses its oily appearance, then wash well under a stream of distilled water, so as to drive off all traces of free nitrate. This last precaution is indispensable, if one would avoid stains, &c., on developing. Drain for a short time, and then pour on the following :—

Distilled Water . . . . .	10 ounces.
Dextrine . . . . .	5½ drachms.
Oil of Cloves . . . . .	½ drop.

This should be poured on at the corner, held by the thumb, and made to flow steadily over the plate ; so that it may drive off the least trace of water left on the plate. Pour on another quantity of solution, so that the film may become permeated, then put on one side to drain, free from dust. Plates so prepared will keep many days, both before and after exposure.

The developer is—

Distilled Water . . . . .	10 ounces.
Pyrogallie Acid . . . . .	10 grains.
Saturated Solution of Sulphate of Copper . . . . .	1½ drachms.
Glacial Acetic Acid, 50° . . . . .	1½ drachms.

Before pouring on this developer, wash the plate well in distilled water. After the developer has been on two or three minutes pour it off ; and, by means of a silver hook, immerse the plate in a dish, containing solution of nitrate of silver, 12 grains to the ounce of distilled water ; the image will appear immediately. If it lack intensity, repeat the pyrogallie solution, and follow with the silver. The fixing is same as usual. The exposure about double that for wet collodion. The solution of dextrine will keep for a long time if it is carefully filtered before using.

## CHAPTER IX.

## OPALINE PHOTOGRAPHS.

AS these portraits are becoming fashionable, we shall give an account of a method of production whereby excellent results can be obtained, without interfering with any of the patents granted. These pictures derive their name from the glass upon which the photograph is taken, being enamelled white, like opal. Having cleaned the enamelled side of the opal glass—which can easily be seen by looking at the edge,—pour on the collodion recommended for the tannin process, and prepare the plate as an ordinary tannin plate, increasing the tannin to thirty-five grains to the ounce, the citric acid to thirty grains (pp. 46, 47.) The surface of the tannin is so hard that a negative may be placed in close contact without injuring it. The negatives most suitable for printing by this process are those that are rather weak but full of detail. The negative, having been placed upon the prepared plate, can be kept in its place by one of the American clips being placed at each end, the arm of the clip at the front of the negative being cut short, so as not to keep off the light from any portion of the figure. The plate may now be brought into diffused daylight, not direct sunlight. Two or three seconds will generally be found sufficient; or if the plate is held to a gaslight, it may be printed quite as easily in about thirty seconds. The judicious management of the exposure is the principal difficulty in printing transparencies; it also materially affects the colour of the resulting positive. It is better to keep the negative in motion whilst before the gas. The process throughout is the same as in the tannin, which should be mastered previously to printing transparencies. Of course any other dry process can be used for this opal glass; but the writer has not tried them, as he considers the tannin process the simplest.

The remarks respecting the opaline photographs equally apply to any other method of printing transparencies; and we may here mention that the method of enlarging negatives by means of a hole in the dark-room produces very fine transparencies on opal glasses. The printing of transparencies is a subject very little thought of by the photographer,



although a more pleasing or useful branch is scarcely known. All the very best slides for the magic lantern are transparent positives, printed by a method similar to what we have described; so are also stereoscopic slides on glass. Those on opal glasses are used for lamps, fire-screens, &c.; and cases are made purposely for the opal portraits, so that they can be seen either by transmitted or reflected light.

Our readers will recollect that by Photodiaphanie very beautiful opaline photographs can be produced, and this chapter should be read in conjunction with that on the transferred films. A new glass introduced as "ivory glass,"—is a very suitable material for photographic transparencies intended for coloured miniatures, &c. It has a surface of the colour of ivory, not opaline.

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## CHAPTER X.

# ENLARGEMENT OF PHOTOGRAPHS.

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EVERYONE is familiar with the fact, that in proportion as the camera recedes from a picture the image becomes diminished, and is enlarged in proportion as the camera is brought close to it. It is necessary to ascertain exactly the focal length of the lens before we can make practical laws for enlarging; for it is found that by multiplying the focal length of the lens by the number of times of enlargement required, and adding to that product the length of that focus again, we obtain the distance of camera to be drawn out. Thus a picture required to be enlarged four times with a lens ten inches focus, will require the camera extending fifty inches, being four times ten inches and ten inches added. When the focal length of the lens is not known, a simple way, that answers all practical purposes, is to take an engraving of any size the lens will cover, and extend the camera until an image exactly the same size by measurement is formed on the grand glass; now measure the distance from the front of the lens to the engraving—half that distance is the focal length of the lens. The following table will show,

without calculation, the respective distances for reducing to one-fourth, or enlarging to six times for lenses of focal length from four-and-a-half inches to twenty inches

### ENLARGING AND REDUCING.

TABLE OF DISTANCES BETWEEN THE OBJECT AND LENS, AND THE LENS AND FOCUSING-SCREEN.

(From the "Photographic News" Almanack.)

FOCUS OF LENS.	TIMES OF ENLARGEMENT OR REDUCTION.							
	$\frac{1}{4}$	$\frac{1}{2}$	1	2	3	4	5	6
Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
$4\frac{1}{2}$	$5\frac{3}{8}$	$6\frac{1}{4}$	9	$13\frac{1}{2}$	18	$22\frac{1}{2}$	27	$31\frac{1}{2}$
	$22\frac{1}{2}$	$13\frac{1}{2}$	9	$6\frac{3}{4}$	6	$55\frac{5}{8}$	$5\frac{5}{8}$	$5\frac{1}{4}$
5	$6\frac{1}{4}$	$7\frac{1}{2}$	10	15	20	25	30	35
	25	15	10	$7\frac{1}{2}$	$6\frac{3}{8}$	$6\frac{1}{4}$	6	$5\frac{5}{8}$
6	$7\frac{1}{2}$	9	12	18	24	30	36	42
	30	18	12	9	8	$7\frac{1}{2}$	$7\frac{1}{2}$	7
7	$8\frac{3}{4}$	$10\frac{1}{2}$	14	21	28	35	42	49
	35	21	14	$10\frac{1}{2}$	$9\frac{1}{2}$	$8\frac{3}{4}$	$8\frac{3}{4}$	$8\frac{1}{2}$
8	10	12	16	24	32	40	48	56
	40	24	16	12	$10\frac{2}{3}$	10	$9\frac{2}{3}$	$9\frac{1}{3}$
9	$11\frac{1}{4}$	$13\frac{1}{2}$	18	27	36	45	54	63
	45	27	18	$13\frac{1}{2}$	12	$11\frac{1}{4}$	$10\frac{1}{2}$	$10\frac{1}{2}$
10	$12\frac{1}{2}$	15	20	30	40	50	60	70
	50	30	20	15	$13\frac{2}{3}$	$12\frac{1}{2}$	12	$11\frac{2}{3}$
11	$13\frac{3}{4}$	$16\frac{1}{2}$	22	33	44	55	66	77
	55	33	22	$16\frac{1}{2}$	$14\frac{2}{3}$	$13\frac{3}{4}$	$13\frac{3}{4}$	$12\frac{5}{8}$
12	15	18	24	36	48	60	72	84
	60	36	24	18	16	15	$14\frac{2}{3}$	14
13	$16\frac{1}{4}$	$19\frac{1}{2}$	26	39	52	65	78	91
	65	39	26	$19\frac{1}{2}$	$17\frac{1}{3}$	$16\frac{1}{4}$	$15\frac{3}{8}$	$15\frac{1}{8}$
14	$17\frac{1}{2}$	21	28	42	56	70	84	98
	70	42	28	21	$18\frac{2}{3}$	$17\frac{1}{2}$	$16\frac{1}{2}$	$16\frac{1}{2}$
15	$18\frac{3}{4}$	$22\frac{1}{2}$	30	45	60	75	90	105
	75	45	30	$22\frac{1}{2}$	20	$18\frac{3}{4}$	18	$17\frac{1}{2}$
16	20	24	32	48	64	80	96	112
	80	48	32	24	$21\frac{1}{3}$	20	$19\frac{1}{2}$	$18\frac{3}{8}$
17	$21\frac{1}{4}$	$25\frac{1}{2}$	34	51	68	85	102	119
	85	51	34	$25\frac{1}{2}$	$22\frac{2}{3}$	$21\frac{1}{4}$	$20\frac{3}{8}$	$19\frac{5}{8}$
18	$22\frac{1}{2}$	27	36	54	72	90	108	126
	90	54	36	27	24	$22\frac{1}{2}$	$21\frac{3}{8}$	21
19	$23\frac{3}{4}$	$28\frac{1}{2}$	38	57	76	95	114	133
	95	57	38	$28\frac{1}{2}$	$25\frac{1}{3}$	$23\frac{3}{4}$	$22\frac{3}{8}$	$22\frac{1}{8}$
20	25	30	40	60	80	100	120	140
	100	60	40	30	$26\frac{2}{3}$	25	24	$23\frac{1}{3}$



In enlarging, the upper figures in the preceding table, give the distance from the lens to the focussing glass, or, in other words, the length of the camera ; whilst the distance of the lens from the object to be enlarged is denoted by the lower figures ; in reducing, the reverse. Thus ; to enlarge an object six times with a lens of eight-inches focus, under the head "focus of lens" find the figure 8, and carry the eye to the last column which is headed by the figure 6, referring to times of enlargement. It will be seen that the focussing glass must be fifty-six inches from the lens, and nine and one-third inches from the object.

There are two methods of obtaining enlarged results from small negatives, the one by producing an enlarged print direct in the solar camera, or, for want of that, by means of an ordinary camera and portrait lens, the negative being fixed in the aperture of a darkened room, and its image projected on a sheet of iodized paper ; the other by obtaining, in the first instance, a transparent positive on glass, and from that making a negative enlarged to the size required. Both processes have their advocates, and both, doubtless, possess merits of their own, according to their suitability to the different character of negative for which they are required. When it is premised that, for the solar camera, a negative extremely thin and delicate, developed solely with iron, but perfect in all its details, is required ; while for the other mode of enlarging, any dense, but well detailed plate, will answer, it will at once be seen that the mode chosen must be in accordance with the exigencies of the case.

The method we shall first describe will be that of enlarging by means of a transparent positive, as being most easily practised ; but for this process the size of ultimate enlargement is usually limited to  $15 \times 12$  inches, larger plates being too difficult to manipulate with ease.

Procure a camera furnished with a long sliding body, or of the bellows form, and having a  $\frac{1}{4}$  or  $\frac{1}{2}$ -plate lens fitted to it with stops of various diameters : to this must be added another camera body, one end of which should receive the slides to contain the negatives for enlargement ; the other joins the front of the camera carrying the lens—in fact, with the exception of the extra body and slides, the camera and lens remain the same as usually employed in taking portraits, with this difference, however, that the lens should so be fitted to the flange that the rays

proceeding from the small negative shall enter the back combination, unless a reduction be desired, in which case, no alteration is necessary. This has been insisted upon by Mr. Shadbolt, want of such precaution resulting in distortion of the image.

The camera being arranged and the small negative placed at the proper end and accurately focussed by turning the whole arrangement towards a bright light; (skywards, if permissible, is the best,) and placing in the lens the smallest convenient stop, (according as the subject and nature of the light may indicate,) the greater the enlargement, the smaller the stop; it is only necessary, supposing that you wish to enlarge from a  $\frac{1}{4}$  size or C.V. plate, to coat a perfectly clean half plate and free from flaws, with an old collodion, as being less liable to solarise the shadows, and take the transparency either of the same size or a little larger than the original negative. This transparency should contain all the details of the former; and here the very greatest care and judgment are necessary, for if the transparency be in any degree inferior in detail, or have blemishes which do not exist in the original, a careful and faithful enlargement cannot be expected. To guard against such a failure, it may sometimes be necessary to take several positives in order to select that one which bears the most truthful resemblance to the original. No rule can be given with regard to the exposure required, the same differing with the focus of the lens, the quality of negative, and the degree of enlargement attained in the positive; the writer has found, however, that a rather full exposure is, in most instances, preferable, so that the image may not on developing come up too tardily. The same remark applies, to some extent, to the negatives most suitable for this process of enlargement; under-exposed pictures, or those showing much bare glass, seldom giving good results.

For developing, the usual 15-grain iron solution, or 30 grains of the double salt, may be used, followed by pyro and silver, but great care must be taken not to intensify too much; experience in this will be the best guide.

The transparency being now obtained, the next step will be to produce from it the enlarged negative, for which purpose dry the transparency, and if it do not completely cover the plate, paste round the edges of bare glass some opaque material to exclude all superfluous light, and fix the



same at the end of the camera formerly occupied by the small negative, and repeat the operation of focussing; this, it is absolutely necessary should be performed facing a clear sky, at least, there must be no chimney tops or house gables in the way, as any such, though not appearing through the former dense negative, will, if now present, so modify the light in certain places as to have an injurious effect on the result.

For developing, the same solutions are required as before given: stronger may be used, but are rarely required but in a very weak light.

For sensitizing, some prefer the vertical dipping bath, others, the flat gutta percha dish, and no doubt for very large plates the bath is preferable, as effecting a considerable saving in the amount of silver solution required.

#### THE SOLAR CAMERA.

This instrument, the invention of Mr. Woodward, has come into very general use in this country, from the facility with which life-size portraits can be obtained from small negatives, and were it not for it requiring the presence of the sun, (not always attainable,) would perhaps be the best mode of enlargement. By it proofs may be printed upon either albumenized paper, and toned and fixed in the ordinary way, or with greater rapidity upon iodized paper, and afterwards developed: the latter is most generally used, an improved bromo-iodized paper being manufactured by Mr. Sandford for the purpose.

The camera is placed in a window having the sun upon it most of the day, a southern aspect is best as it will enable you to work nearly the whole day in summer, and in the winter, from mid-day till four o'clock, but the sun will then be so low as to necessitate your lowering the mirror end of your camera about twenty-five degrees to prevent the sun entering the condenser. Its light, be it remembered, must come *only* from the mirror to the condenser. Although the sun very much hastens the process, very good results can be obtained without it, but in the latter case the picture will not be so clearly visible upon the screen, and experience must decide how long you must expose it. As soon, however, as the outlines of the figure show themselves, the operation is generally complete.

Every portion of your room should be well darkened, a frame covered with yellow calico being made to fit the upper half of the window not occupied by the camera. The mirror is now brought to its reflecting angle, which is accomplished by the aid of screws attached to the camera, and a luminous disc formed upon the screen : now place your negative in the groove inside the camera, and having "turned off the sun," focus its image upon the screen : pin your prepared paper to the board, being careful that it lies perfectly flat, now turn round the mirror so that the sun may proceed with the printing of the picture, which it will do on iodized paper, and with a moderately dense negative, in from fifteen seconds to ten minutes or so, or if the sun be absent, two hours may be required : the time is, however, modified by the extent of the enlargement effected.

The sensitizing solution need not exceed thirty grains to the ounce of water, a good formula is the following :—

Nitrate of Silver . . . . .	1 ounce.
Glacial Acetic Acid . . . . .	$\frac{1}{2}$ drachm.
Water . . . . .	16 ounces.

The developing solution consists of a saturated solution of gallic acid, with about half a drachm of acetic acid 50° to the pint.

It may be applied by means of a pad of cotton wool, or a better way will be to fold the edges of your picture up, so that the whole may form a dish : the solution is then poured on and a rocking motion imparted, the picture will soon appear ; first the outlines, then the details of the figure will develop themselves. When well out, a little silver solution may be added which will materially strengthen and blacken the picture.

The picture being now fully developed, it must be well rinsed in a dish of water, and afterwards allowed to fix in a solution of hyposulphite of soda of four ounces to the pint : in this it must remain till the yellow iodide is perfectly removed.

In conclusion, it may not be out of place to describe the character of negative required for this process, and the means of obtaining it : it should be what is generally known as an over-done positive. All the detail should be *visible* when looked through, but only faintly sketched in ; indeed, Mr. Sidney Smith, who has had great experience with the solar camera, has stated that the negative cannot possibly be *too thin* ;



it must, however, be perfectly sharp, and the shadows quite transparent. The very best formula for developing such negatives consists of a solution of sixty grains of protosulphate of iron to the ounce of water, and thirty minims of glacial acetic acid.

This must not be allowed to remain on the plate until the picture has acquired its full density, but proceed as if developing for a glass positive.

The picture, when dry, should *not* be varnished.

As we find the plan of multiplying negatives is adopted by many photographers, we will give a few hints on the production of such pictures. It is often desirable to adopt this method where a great many copies are wanted from one negative, and the time given is very limited; but we should not advise any one to employ it without being compelled by some such circumstance. Some artists are often obliged to multiply negatives when they take a notable person and receive orders for 50,000 to 100,000 copies, and probably have only two or four negatives at the most; but the effect of multiplication is seen very distinctly on examination. The method of multiplying generally adopted is to take a transparent positive by the same method as the opaline photographs, by bringing the negative and a dry plate into contact, and then to produce negatives from the transparent positive. Some adopt a different plan and enlarge from a Carte de Visite negative to a  $10 \times 8$ , get the print finished in sepia, and then take a number of Carte de Visite negatives from it. This is perhaps the best method.

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## CHAPTER XI.

### VIGNETTING, &c.

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SOME photographs are greatly improved by being vignetted; but very few persons take the care necessary to produce the best results. To "vignette" properly requires some artistic feeling, for the vignette plate may be used injudiciously and thus spoil a good picture. Some

photographers want vignetting in one shape and some in another; so that without a person has a complete set of "vignettes," or makes them himself to suit the subject, he is very liable to err. What we shall say respecting the *making* of them will apply more to amateurs, as we know photographers in general have not the time to make or attend to them, and have to be contented with those already made.<sup>7</sup> Vignette Plate are made of glass flashed with deep orange on one side only, so that by acting upon this side with an etching liquid, the centre is eaten through to the clear glass. They should be chosen with the colour softening off to the centre as gradually as possible, or they leave an abrupt margin in printing. The simplest way of vignetting a picture is to fasten the vignette plate with gum paper on a piece of cardboard with an opening cut in it a quarter of an inch smaller than the outside of the vignetting plate. The outside of the cardboard should be the same size as the printing frame. Then place the cardboard containing the vignette plate outside the glass of the pressure frame, between the plate glass and the frame. By this plan the possibility of the breakage of the vignette plate is not only obviated, but additional softness is given to the picture. This result may also be accomplished, by fastening a piece of cardboard to the outside of the printing-frame, about half an inch from the glass, with an opening cut in it suitable for the picture to be vignetted; then to produce the vignette effect, fill in under the edge of the card with cotton wool so arranging it as to gradually lessen in bulk, as it approaches the centre of the negative. By either of these methods the vignetted pictures are produced with *dark centres*, fading off to *light edges*. If this style of shaded vignette does not suit, it may be altered by taking a proof from a negative which has been stopped out with black varnish, so as to produce a white background. Place the negative in the pressure frame (supposing it be a portrait,) trace the figure out on the glass of the pressure frame with gum water, put the proof, with the white background, in its proper place under the negative; then by sticking cotton wool to the part gummed, collecting it so that it shall be thicker in the *CENTRE* of the figure, and a vignetted picture is produced with a *light centre*, shading off to a *dark edge*.

A variety of vignetted pictures is formed by placing an ordinary photographic mat of a suitable size, and with a pin scratching its



shape on the negative; the film of collodion outside this scratch is then carefully removed with a knife; the negative is then printed in the ordinary way. A "medallion" picture is thus obtained, in which the bust of the portrait is surrounded by a dark border with sharply defined inner edge.

Where vignette plates are not within reach, a good substitute can be formed by making a hole in a piece of cardboard, of an oval pear shape, and cutting the edge of the aperture in well defined notches. This placed about three-quarters of an inch from the pressure frame will then give a very soft vignetted picture. Vignetted pictures, as a rule, should not be printed in full sunshine, but in a steady light, and always at right angles to it.

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## CHAPTER XII.

# ALABASTRINE PHOTOGRAPHS.

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THESE are on glass, and are so called from the appearance of the whites, which resemble alabaster. When well executed, they are certainly very fine, and resemble an ivory miniature. To produce these pictures, a positive is produced in the ordinary way; it should be exposed the proper length of time for strong marked lights and shadows; after fixing, it requires to be well washed, to free it from any trace of cyanide of potassium; then place on a levelling stand, and pour on the following solution:—

Water	. . . . .	8 ounces.
Bichloride of Mercury	. . . . .	$\frac{1}{4}$ ounce.
Protosulphate of Iron	. . . . .	$\frac{1}{4}$ ounce.
Fluoric Acid	. . . . .	12 drops.
Or,		
Water	. . . . .	1 ounce.
Saturated Solution of Bichloride Mercury in		
Hydrochloric Acid	. . . . .	20 drops.
Protosulphate of Iron	. . . . .	20 grains.
Nitrate of Potash	. . . . .	12 grains.
Alcohol	. . . . .	$\frac{1}{4}$ drachm.

If the solution be warmed, the plate may be held in the hand, as its action will be then much quicker. The picture will at first turn nearly black, then it gains in intensity, while, at the same time, the whites attain their utmost brilliance. The time for this effect varies from ten minutes to half-an-hour: it is, however, better to over-develop than under. The pictures should then be well washed, and afterwards varnished with a very thin colouring varnish which will not "lower" the whites. It is necessary that they should be well protected from air, or they are sometimes liable to fade. If the precaution of gumming a strip of paper round the edge of the glass placed at the front of the picture, be adopted, they will remain unchanged for years. We have some, taken five years ago, which do not show the least trace of changing.

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### CHAPTER XIII.

## HOW TO TAKE STEREOSCOPIC PICTURES.

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**F**OR the production of pictures suitable for viewing by the Stereoscope it is requisite to have a pair of pictures identical in subject, but differing in the visual angle:—that is, one picture should give the view which would be presented to the right eye, and the other the one which would be presented to the left eye. The optical arrangements of the stereoscope combine these two pictures, and give the marvellous effect of a solid original. There are many ways of producing these pictures. Some employ two cameras, with separate plates; but there are several objections to this plan. They are also taken with one camera, by moving it a few inches for the second picture. This plan is troublesome without the camera-stand is made with a sliding top, so that the camera can be moved easily about from left to right without moving the stand. The



most ingenious camera we know of this description is Powell's Registered Stereoscopic Camera, which is so arranged as to allow the operator to take eight pictures, being fitted with four double backs, two view lenses, and other arrangements, all fitting into a small box weighing only about five pounds.

There is also another arrangement, where the back of the camera moves. But the best camera we have found is the binocular, which is furnished with two lenses of equal foci; by this means the two pictures are taken at one time, and on one long piece of glass. There are many arrangements of binocular cameras in the market, most of which have their merits. The best binocular camera we have used is that in which larger glasses than the ordinary stereoscopic size are used; it should be fitted with a pair of achromatic lenses.

Thus much having been said upon apparatus employed, we will simply add, that the negatives taken by the stereoscopic cameras are produced by the means before described, viz., the iron development method for instantaneous pictures, and the direct negative, or one of the dry processes, for other pictures. The only other remarks necessary are, that the pictures produced by a binocular camera are transposed, or the reverse of what they should be; that is, the right hand picture requires to be placed on the left hand in mounting, and *vice versa*. A better way, we think, is to cut the negative in two, transpose the pieces, and cement them by the edges to another plate of glass. Lengthy exposures are generally required for stereoscopic negatives; for unless they are soft and full of detail, they have a very dead and chalky effect in the stereoscope, although very good as pictures.

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#### CHAPTER XIV.

### THE ÆSTHETICS OF PHOTOGRAPHY.

FROM THE FRENCH OF M. DISDERI.

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IF the sole aim of photography were the reproduction of Nature, without taste or choice, it would seem sufficient to possess a knowledge of the necessary optical instruments and chemical materials. This

knowledge, however complete, would not suffice alone to ensure a perfect copy of the reality, for the reader will observe that it is necessary to vary the operation according to the nature of the object and the circumstances in which it is placed. He will find that one manner of proceeding will be likely to produce vigorous and strong effects; that another should be employed when "softness" is required, or where the objects are well and uniformly lighted; and that it is always essential to combine the distances according to the power of the instrument, so as to obtain the exact proportions in the image as exhibited in those of the model. Thus to appreciate the effects of the light, distance, and all the circumstances which tend to modify the scene, necessitates quite a different knowledge to that of the requisite chemical substances: it causes the operator to observe attentively the effect produced, and to study the causes which produce it,—the distribution of the lights and shades, the relative intensity of the different coloured masses, the perspective of the flat surfaces, and lastly, the proportions of the different objects.

Thus, for the reproduction of nature, taken at hazard and without any choice, the photographer must possess, in addition to an acquaintance with the laboratory, a knowledge of a very different order; and he is forced to a course of study very similar to that which serves as a base to the art of the artist.

But, the aim of photography is not merely to produce nature taken at hazard: choice ought to preside at the operations, and the choice is determined by the ideas or the temperament of each individual. It is for this reason that peculiarities are apparent in the productions of different photographers, which reveal the personality of the author. In fact, each individual chooses his subject according to his particular idea of the beautiful. In the scene to be represented he arranges the parts, and combines the *chiaro-oscuro* according to his taste; and even in the execution itself he finds numberless combinations for the general aspect of his work.

We will now consider what development the artistic studies of the photographer should undergo. We find them nearly as vast as those of the painter himself. Like the painter, he ought to study the laws of beauty, and the means of producing it by composition,—the forms, the disposition of the parts, the *chiaro-oscuro*, and lastly, the execution. It



is by no means sufficient to feel that a thing is beautiful to be an artist ; one must know *why* it is so, and if this beauty may be expressed by means of the special art that one studies. If so, it is necessary to know the key to all the combinations belonging to this particular language, by which the ideas and sentiments are to be expressed. Thus the photographer is as unable to dispense with these essential studies as even the painter. One must, nevertheless, be very careful not to confound photography with painting, notwithstanding these striking analogies between the object and the means of obtaining it. These are, in reality, two very different arts ; but we will attempt at once to give the distinction, as it will aid us materially in giving a clear definition of photography.

In the first place, then, photography has nothing in common with painting, considered as an art which seeks expression by colour. We know the eloquence that painting derives from colour. This powerful resource, which modifies so completely the combinations which preserve the other parts, does not belong to photography. If one wishes to render a parallel possible between the two arts, and make the comparison clear and distinct, one must not compare photography with polychromic painting, but with cameo painting, or drawing ;—the analogy would then be complete, as far as the visible aspect resulting from the material employed is concerned ; for we know that the photolgraphic drawing may be obtained in all shades, and on a great variety of substances, always producing the same aspect. This consideration, notwithstanding its seeming insignificance, has its importance in the fact that the general colour which pervades the whole, being appropriate, must increase the signification, the harmony, and the beauty of the subject.

It is, therefore, not the question to establish a comparison between *bonâ fide* painting and photography ; we merely consider the proof furnished by the light as a "drawing." Let us try to distinguish, in their "*ensemble*," the fundamental causes which determine the character and the signification of the natural spectacle, this common basis of both arts.

Bodies exist in their geometrical forms, and are situated in different parts of the space which is extended before our vision : the light illuminates them by distributing its rays over their surfaces, not only

rendering their forms perceptible, but revealing also two properties, belonging to the essence of the bodies, and completing the total of the elements which constitute the natural spectacle, namely, colour and tone. This demands an explanation. Without entering into the relative considerations regarding the decomposition of the rays of light on the surface of bodies, which is doubtless the sole cause of the phenomena of which we are about to speak, one may remark that different bodies present not only different colours, but also different degrees of brilliancy, under the same light and in the same situation ;—they are more or less light or dark ;—they have a light which belongs to them naturally, and which shows itself independently of all colouring. This distinction between the natural colour of bodies, and what we shall term the *chiaro-oscuro*, or tone, is of considerable importance with regard to the art with which we are now occupied, as it will serve to establish, with much exactitude, the limits which we are bound to observe in representing nature.

The form of objects, their colour, and their natural tone, revealed by the light that shines on them, are the elements of the picture. The position of the forms amongst themselves, the objects with regard to the light and with regard to us, produce infinitely-varied effects, by creating innumerable relations between the different elements of the visible spectacle. But from all these combinations there will result a general effect, which will be the character or the signification of the picture which presents itself. It is, therefore, very important for the artist, of whatever kind he may be, to know in what degree each of the elements that we have first enumerated conduces to the final result, for every art has its limits ; and he must, above all, possess the means of uniting in his imitation the elements which constitute, by their relations, the signification of the natural spectacle.

If the artist, or the photographer, is struck by the beauty of an object, he ought to seek to appreciate the cause, or rather the origin of his impressions : it may be the assortment of colours, or perhaps some happy contrast, which renders the character of the scene more striking. This eloquence of the colour may be so strong as to govern all the rest, —so much so, that by withdrawing from the picture the harmony and expression which it receives from its colours, that which remains, namely, the form and the effect, would produce quite a different



impression, and very possibly one free from beauty. This is the reason that many photographic proofs, taken of scenes which possess a good deal of effect, in reality are so often dull, and totally devoid of the character which had struck and determined our choice. It is, therefore, necessary for an artist or a photographer to examine and to analyse the effect which has attracted their attention, and to consider the nature of what they wish to represent free from all colouration. This art of separating from the sensation we receive all that can not be expressed by the artist and the photographer, so as only to leave that which may be reproduced by their arts, is by no means so common as is thought, and must be constantly exercised to acquire the necessary development for practical use.

Let us suppose a subject that derives none of its essential signification from the colour, and introduce it into the comparison established between photography and painting.

In the point of view of exact imitation of nature, the two arts present the most striking similitude. The photographer could, in fact, express the natural spectacle, with its forms, its accidents of perspective, its lights and shades, &c., equally as well as the painter. The photographer would, however, encounter some difficulty in the more or less photogenic objects, which often change the natural lights and shades, and do not always admit of exact representation. In some cases, even if the objects on which the light chiefly falls are of a very slightly photogenic colour, the effect produced by the light on the sensitive materials will no longer be in proper relation with the natural effect. The operator must seek to overcome this by resorting to the varied natures of his preparations: thus, in imitating a simple natural object, the photographer cannot follow the same path as the artist: they separate at the commencement, and what is more remarkable, the photographer is obliged to take those important parts, the colour and the shades, into consideration.

But, as we have already observed, imitation, without choice, is not the sole aim and end of photography; and here the difference between the two arts becomes very strong. Whilst the painter chooses, by a sort of natural impulse, the objects in nature of the most opposite character, and groups them together, modifying either in their positions or detail, the photographer would be totally unable to dispense with the presence

of the objects which he wishes to reproduce. He is obliged to constitute the reality before he can think of representing it ; and, for the most part, the elements which would seem to him the most appropriate for rendering his sentiments, could not possibly be brought together for that purpose. Moreover, he cannot make any considerable change in the object he has chosen ; he can merely cause them to undergo a few superficial modifications, which are incapable of causing any essential change in their character. Examples will give a clearer idea of the distinction that must be established between the natural resources of the two arts.

If it is wished to express the sentiment of calm and tranquility which is suggested by an early morning excursion in the country, and which is the result of the varied scenes spread out before our eyes, the artist, if he is a painter, may revive in his memory different variations and aspects of landscape which have struck him previously ; for instance,—the forms of trees, the undulating course of a road, the peculiar effect of a piece of water, and the like objects. He calls to mind the shepherd that he noticed seated at the edge of the forest, the group of vine gatherers who listened attentively to the sweet harmony of his flute. He assembles these scattered fragments in one single composition, and if some part be wanting that seems to him to be essential to the character that he wishes to create, he seeks in the vast field of nature the appropriate object to supply the deficiency. Whether he procures the subject of his picture from his imagination, or whether it is actually before his eyes, he modifies it so as to suit his taste and wishes. Faithful to the first law of beauty, he would give the utmost importance to a certain part—diminishing that of the others—and at the same time establish relations between them so as to preserve the proper effect of the whole.

But if the artist be a photographer he would proceed in quite a different manner. Like the painter, he has seen and understood Nature : but, unlike him, he is unable to combine the scattered elements which have originated his idea ; he is consequently obliged to seek all these elements assembled in reality. With this aim he searches diligently through plain and forest, analysing and observing the beauties of each new scene. Here and there he meets with some of the effects that he is desirous of obtaining ; at these he hesitates, changing his position from



right to left for the purpose of including some object that was not visible before; he approaches so as to obtain a clearer background; he retires so as to include all the objects of the foreground that he deems essential to his picture,—calculating all the while, by increasing or diminishing the horizon, how to obtain the most favourable effect of perspective. It is thus that he composes his picture by means of a series of systematic calculations. He has chosen, in short, his point of view so as to exclude all the objects which might interfere with the harmony of his picture. But this is not all: he still retains two important means of increasing the unity and the effect of his subject,—the first is by the choice of light; the second, the choice and agency of the figures that he may introduce into the composition. He will, therefore, study the scene he has chosen under the different aspects of light and shade that it possesses at different hours of the day. He watches the shadows increase and decrease little by little; the several surfaces that are lighted up one after the other; the rays of light that pierce the shadows, rendering visible a multitude of objects that were hidden from view but a moment before; even till the objects themselves appear under new aspects. What a vast field is thus open to the artist,—what resources he possesses in these innumerable shades and tints, if he appreciates exactly and fully the characters which may be translated by means of his art! It is in this that taste constitutes a perfect power of creation, by seizing the exact moment when Nature has assumed the maximum of the expression that the artist seeks.

As to the personages introduced into the scene, the artist may choose them appropriately to his subject; their presence in the middle of the scene would be influenced by the disposition of the objects in the foreground. The photographer would proceed in this respect in the same manner as the painter, deciding whether the personages should merely be accessory to the picture, or whether they should occupy, on the contrary, the most prominent part of it. In the first case, he would place them far back in the perspective, or bury them in the shade; in the second, he would advance them in the foreground, so as to increase the importance of the animated group, and thus complete the character of the scene.

It is thus apparent that both the painter and the photographer, guided as they are by the same ideas of beauty and unity, and led by the rules of beauty and unity which tend to realize the first conditions of every work of art, are essentially different with regard to the mode of proceeding in the composition. The painter has no limit in the choice of his objects whose representation he wishes to constitute the subject to be expressed. He unites his scattered notes according to the flow of his thoughts ; he searches freely through Nature for separate harmonies of which to form a concert ; he is by no means obliged to paint the reality, he despises it. On the contrary, seeking to render his thoughts by the creation of scenes which have an appearance of probability, the difficulty he meets with in the exact imitation obliges him very often to content himself with revising, by means of imperfect copies, the idea of the objects themselves, which are rather signs tending more to revive than replace them. The artist can, moreover, leave out all the superfluous details that trouble the unity and expression of his picture.

The photographer, however, finds himself influenced by very different and much more rigorous conditions with regard to Nature. He is bound to the reality : in the composition he is unable to free himself of it, and in the execution he is condemned to exact imitation. The unalterable fidelity of his instruments renders each minute detail. It is in vain that he seeks by the choice of a shorter distance to increase the plains, or to concentrate all the exactitude of reproduction on the most prominent parts of the image. The result thus obtained would be very imperfect, as this process would enlarge the other objects, and thus cause a want of perspective exactitude that would render the picture devoid both of truth and beauty. Thus we see that the photographer is absolutely compelled to restrict himself to the exact imitation of the reality, and that his art consists in choosing scenes which really exist, and in making such modifications of them as the nature of the objects permit and the sovereign laws of beauty point out to him. Photography, therefore, cannot be confounded with Painting, although they are both branches of the creative arts. Like painting, too, it is a real science, deduced from the assemblage of means which it employs to express that beauty which combines unity in the sentiment, as well as in an optical point of view. It is the grouping of these means, in fact, that deter-



mines which subjects belong to this branch of the art, and which require to be treated according to positive laws.

We do not pretend to draw the reader into a didactic research of the rules which may be logically deduced from what we have endeavoured to establish, and which constitute the true treatise on the art. We shall now proceed to consider the different subjects that belong strictly to photography, noticing as we go on the principal laws which direct the artist how to treat them.

#### THE DIFFERENT KINDS OF SUBJECTS IN PHOTOGRAPHY.

Art is always the same, and it is always the same principle that ought to guide the artist. Whether he devotes himself to the execution of a portrait, composes large scenes, or whether he reproduces scenes in which Nature herself is inanimate, he invariably has to do with forms, proportions, attitudes, the effects of light and shade; and whatever branch he may treat, if he wishes to obtain a clear and determined expression he must follow the great law of unity, which orders him on no account to weaken the interest on several points of equal importance, which but unite the points of interest around a common centre. The composition ought to possess but one point of interest of a decided character, and the forms, attitudes, shades, and, in fact, every part of the picture, ought to concur to the expression of this character. Let us consider two compositions of totally different subjects; for instance,—a portrait and a scene from inanimate nature. In the portrait it is the individual represented who ought to constitute the feature of interest; the accessories which surround him—the draperies, the architecture, the background, the scenery—must all be mere subordinate details. If the back of the picture represents a very interesting action, the attention is divided. In the composition which represents inanimate nature,—a group of deer, for instance,—if you introduce the hunters, horses, &c., you have again destroyed the unity of interest, and disregarded in both cases the same law of art. The result must either be a bad picture, or a different one to that which you intended to produce. What we observe on the unity of interest in composition, applies equally to the other parts of the art. If you have formed by the distribution of light several luminous masses of equal importance; if in the arrangement of the

forms there appear lines which attract the eye with equal force: if, lastly, objects of very similar volume are placed in the same perspective direction, you have equally troubled the unity, decreased the interest, and destroyed the true signification and character of your picture. In all branches, as in these, the same defects would result from a neglect of the first laws of your art.

Thus, strictly speaking, there are no laws that belong particularly to the different kinds of photography, as regards regularity and beauty; but there are infinite applications of these laws,—applications as numerous and varied as the conceptions created by the fantasy of the artist. It is evident that these applications differ in the same degree as the subjects are different; and that similar subjects require nearly similar applications. It is this that renders the peculiarities of the art in different subjects rational and advantageous for study, provided that they do not cause the first general laws to be neglected, which are common to all branches, and which it would be impossible to neglect without completely destroying the value and effect of the picture.

#### OF THE PORTRAIT.

Nothing in Photography appears easier at first sight than a portrait. It seems sufficient, to ensure the desired result, that the model should remain perfectly still, and that the operator employ the shortest possible method. Does not the light copy the object with perfect accuracy, and give a faithful *fac simile*? How is it, however, that so many portraits are not at all good likenesses, and that it is so rare that the resemblance is so complete as to satisfy the friends and the relations of the individual who has been the model? How is it that the different representations of the same person are so varied that they sometimes express very different, and sometimes even opposite, characters? Are there not amongst the same portraits those which may be considered as good likenesses, some equally pleasing and others ugly? What is then the meaning of this difference in the copies of one and the same object, if it be not that this object presents infinitely varied aspects, amongst which only a small number are capable of giving an exact and pleasing representation of its true character, which alone constitutes the portrait? In truth, to make a portrait it is not necessary to reproduce that proportion



or form of the individual with mathematic exactitude ; but it is requisite, above all, to represent them according to the character of the individual, with the modifications and developments which have been given to him by habit, opinion, or social life. Those who know the individual to be represented will come to a very clear understanding on this point, which is the result of all the various aspects in which they have seen him ;—if they knew how to express this idea, they would render the portrait a true resemblance. The artist must see and comprehend his model in the same way. In addition to this, he must attempt the beautiful without losing anything of the truth.

Neither photographers nor their models are impressed with this idea. They prefer to think that the resemblance consists in the exact reproduction of the proportions, the features, and the attire. Thus portraits are very often caricatures of individuals, representing only the unpleasant traits of the original, with something of his features by which he may easily be recognized. In such photographs the details are the most admired. One recognizes the beard, the dress, the various peculiarities of the individual that are even more insignificant than those we have just mentioned ; and sometimes we may notice a familiar smile, and this but very rarely. But where is the moral character, that we admire so in the person represented—his serious or lively expression—his good disposition, that charms us ? The orator, for instance ; do you recognize him as the individual that impressed your mind so forcibly by his splendid flow of eloquence ? Is it in this attitude that the general stood before the columns of his enthusiastic followers ? No ; they would scarcely recognize their leader in this unnatural position, if it were not for his uniform, and some unmistakeable peculiarity of form or feature.

The first step that a photographer should take to obtain a good portrait, is to penetrate the numberless aspects under which he sees his model, and to ascertain the real type and character of the individual. It is thus alone that he is enabled to conceive an appropriate representation, and to choose the particular attitude and expression, as well as the distance, light, and accessories of the picture ; and knowing these, he seeks to obtain the optical combinations requisite to express the result of his observations :—in a word, he composes his portrait.

To compose a portrait is, therefore, to choose the best mode of representation, and to combine all the parts in view after this unique method. We will endeavour to explain this clearly by the following example:—Imagine a philosopher, who has passed his life in study and tedious research. The habit of constant meditation has marked his forehead, which rests on his hands, with deep vertical furrows; he is a man below the ordinary stature; his mind seems to have been developed at the expense of his body;—he is calm and benevolent; his smile full of sagacity. These are the characteristics of his appearance in every-day life, when he is surrounded by friends and relations; his attire is naturally in keeping with his moral and physical being. It is very simple, and evidently a matter of very secondary importance with the wearer. Such is the man who desires his portrait. He will probably present himself to you in a costume for the occasion, which in no respect resembles his ordinary apparel. He will put himself in a stiff premeditated position, holding a large folio in his hand; but, preoccupied with his studied expression, he does not, in reality, read a single line. It is for the photographer to distinguish, under these borrowed expressions, the true and genuine character of his model.

If he has once made himself master of the personality of his subject, he will easily conceive the style in which he ought to be represented. The aspect of the portrait ought to awaken, independently of resemblance and the like considerations, calm and serious ideas; it must possess simple attitudes, an interior light distributed in tranquil masses, with half shades, deep background, and a great sobriety of accessories. The head, being the seat of thought, presents a brilliant and luminous aspect. Such is the style to be adopted in this case; any other would be unlike and inappropriate, and would not produce the profound and powerful resemblance that we desire.

We must now proceed to combine the details and parts of our picture; but as it is the knowledge of the individual which has served to determine the style, all the details must be in precise agreement and harmony with it. If the photographer is efficient in the other principles of his art, he must thus obtain both a striking unity and a large and beautiful resemblance. Let us take another example, in a type of totally different character, namely,—a soldier: although very young,



he has acquired the right to command ; his carriage, looks, his entire bearing, express pride and courage ; he has distinguished himself in the late war by acts of unusual daring.

The aspect of the picture is clearly indicated : life, passion, and energy must here be expressed. It would be absurd to wish to treat this portrait after the same method as the former one. The open air, plenty of light,—no mysterious half tones, the body firmly posed, the gesture frank, without anything vague or uncertain,—numerous details, so scattered as to confuse the beholder : such would be the proper mode of treatment of the subject we have just described.

We do not pretend to say that whenever we have to take the portrait of a learned man, or a soldier, it would be necessary to follow one of the styles that we have just indicated ; on the contrary, we merely indicate the general character, leaving it to the reader to modify the aspect given to the picture, by as many differences as he finds in the individuals themselves. The severity of thought in the sage is tempered by enjoyment. The ardour and energy of the soldier is often accompanied by benevolence, and even tenderness. These different shades and degrees must, of course, be clearly expressed in the likeness.

That which strikes us first, in the individual, is his structure,—the width of his body in proportion to the height. It is necessary to take a sufficient distance, so that the difference of the planes and surfaces cannot interfere with these proportions. If the object be sitting, with his knees and feet turned towards the lens, the head will be found to be on a level, upwards of a foot distance from that of the knees. This deformation would give the idea of a small head, a feeble body, and strong legs. The operator is, of course, always obliged, by the necessity of obtaining clearness in the field of his image, to take a sufficient distance. However, the distinctness of all the parts does not always indicate that the proportions are preserved. The perspective effect exists, but although correct in itself, it gives incorrect appearances to the reality. Thus, the artist would allow a considerable distance, if he wishes to preserve the exact proportions of his model ; but, as his aim is not only to produce a correct, but also a beautiful representation, he will attempt, by varying the distance, to modify and embellish his model, without altering its character. If he wishes to take a good portrait of a

person who has slender legs and a large head, he could shorten the distance a little, so as to diminish their ugliness, and give them a better proportion. Of course, the artist dares not do too much in this sense, for, unless he seizes the exact moment when the modification must not be continued, he will spoil the resemblance. What we say here with respect to the general proportions, is applicable to all the parts of the figure. The disposition of the abridgments, in comparison to the distance, allows the artist to preserve the general character of the stature of the individual, and, at the same time, to improve it. It is impossible to foresee all the circumstances,—but it is sufficient to explain these different optical effects to the photographer, for him to understand why so many portraits, in which the perspective is irreproachable, give the idea of individuals being little, or tall, although the originals do not in the least possess these proportions.

The position of the personage in the frame, and the disposition of the accessories, are also practical means of determining the stature of the individual, which the photographer should by no means neglect. Thus, the figure will appear much larger, if the head is placed near the top of the frame and plenty of free space left at each side. It will be increased and diminished in size as it is approached to the right and left edge of the frame, with a good deal of space above it. We shall, therefore, be liable to diminish the resemblance of a portrait considerably, by not paying sufficient attention to these effects, and deprive ourselves at the same time of modifying and embellishing, to a certain extent, the proportions of the model.

The choice and disposition of dress have a very great influence on the proportions; and close fitting light cloth garments increase the dimensions of the head, the hands, and the extremities;—a flowing and ample dress, on the contrary, renders these parts little and delicate.

Again, by the direction of the light, and the distribution of the lights and shades, the artist is also able to increase the character of the proportions which constitute the resemblance of the individual, giving, at the same time, a new beauty to the likeness; he will render certain parts thinner by plunging them into the half tone, or by burying their outline in the shade; he will deepen and augment other proportions, by surrounding them with light. Thus he would increase the size of



a head that appears too small, by throwing the light on the face ; and diminish the size, by choosing a tint that would throw one half of the face into the shade. In general, a dark background serves to make heads appear small, and a light one increases the size. Backgrounds of a middle tone, on which the lights and shades are equally developed, are the best qualified to give an idea of the exact dimensions.

It is by all these means, combined, that the image obtained presents this first and so important an aspect, resulting from the stature of the model, and which causes it to be recognized at the first glance by the masses that it offers to the eye, and quite independently of all detail, or peculiarity of feature or dress. It is also by these means that the artist is able to embellish the proportions, without passing the limit of resemblance.

A question which seems to attach itself, naturally, to the one we have just treated, is that of the real size to be adopted for the photographic portrait. Without doubt, the importance of the subject ought to serve as a guide. It would scarcely be proper to give the same dimensions to the portrait of a celebrity, as to that of a little girl playing with her doll. However, the difference ought, above all, to depend on the mode of treatment of the picture, and on the disposition of the scene, which the character given to the subject presents. It is in the importance of the aspect, and in the gravity of the lines, that the artist ought to seek the character, and not in the dimensions. The Greeks and the Egyptians have expressed the majesty of their gods and heroes, in bronze, or clay images, even less than an inch in length. The photographer, in the question of real dimension, must, above all, consider the destination of his picture. If it is to be placed in a very open position, he will increase it in size to that of life, or even beyond. If, on the contrary, the portrait is destined to adorn an ordinary apartment, or a boudoir, he will make it of much smaller dimensions. Should it, however, be destined for a brooch or locket, the likeness must possess æsthetic beauty and majesty, provided the subject will admit of so elevated a style. We scarcely need add, that the methods of augmenting the size render all dimensions possible to the operator, whatever the reduction may be that the original image has undergone, on account of the choice of distance.

The portrait may represent the individual either in full length, in half size, or merely the bust; portraits are even taken with the head alone; lastly, one may group several persons in the same portrait. It is evident that the artist should, by no means, be governed by chance; and that here as well, the rule of the art must guide him in his choice.

The full length portrait is the most suitable of any to express the complete resemblance of the individual, from the expression of the physiognomy down to fine attitude and proportion; but what difficulties the artist has to overcome, before he is able to take a perfect likeness, with regard to both resemblance and beauty!

In the full length portrait, we are not to be guided only by the inflexions of the neck, or the arrangement of the arms; it is the play of the muscles and sinews that determines the general situation of the other parts of the body: the visible position of the feet does not hide, from the eye of a beholder, the absence of equilibrium in the movement. However excellent the inclination of the head, or the disposition of the shoulders and arms may be, if you make the slightest fault by giving an unlucky turn to the knee, or by placing the foot in a bad position, you destroy the whole logic of the position. Nothing is easier in such a portrait than to fall into awkwardness, without resemblance, or even into ugliness. It is, of course, apparent, that the difficulty must be increased by the necessity of producing a resemblance.

The half size, or half figure portrait, ought to give a nearly perfect idea of the individual; it shows the attitude of the body, and indicates the position of the lower extremities, which are absent. If the model is standing erect, the frame will pass about the middle of the thigh; if the model is sitting, the knee and part of the leg will be visible. If this be not so, the pose would be bad, and present to the eye an unpleasant incompleteness; for the same reason, the hands and arms should be full in view.

In the bust portrait, the person is represented as far as the chest, without either the hands or the arms. In this case, the head is everything, and the bust is merely represented to sustain it, and give it its true size and proportion. If the bust be too large, the eye of the spectator naturally desires the arms, hands, &c. One must, however, be very careful not to fall into the opposite excess, by giving too little of the



bust, as the head would appear quite out of its proper proportion: the nature of the model is the surest guide as to the importance to be given to the bust. The modifications that you can obtain, by means of contrast, are important aids for obtaining resemblance and increasing beauty.

It follows, from what we have just seen, that the head should never be represented without the bust. The effect of such a portrait is altogether devoid of correctness and unity, and does not offer a single point of comparison by which the spectator could judge of the proportions of the head with respect to the rest of the body;—a matter of much importance, as this is one of the most striking characteristics of the individual.

The group portrait is often very much abused; and of all the different kinds of portraits, it is the one to which the very worst attempts belong. If it is already so difficult to make a good likeness of a single person, how much more so must it be to compose a scene in which, almost always, the individuals are of different age, sex, and character! Each member has his individual type, which must necessitate a particular choice of attitude, light, and expression. The painter is enabled to produce a certain unity by means of colour, modification of the form, and various other resources which his art places within his reach; but the photographer finds himself face to face with the reality, and must, of necessity, meet with obstacles which the most ingenious and complicated combinations of his art are powerless to overcome.

The method to which all the artists who have obtained the best portraits of this nature have had recourse, consists in grouping and combining the different persons, as it were, by means of some action common to them all. It is thus that a mother is represented playing with her child; girls admiring a piece of needlework; persons examining an album of drawings, &c.\*

The photographer has taken advantage of every subject of this kind, and has almost invariably given some common employment or action to the persons which compose the group. We cannot but remark that some of these conceptions are weak and puerile. Our readers will

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\* See Disderi's fine Card Group of Rosa Bonheur and Family.

naturally observe that an action should always be chosen that is calculated to represent the persons to advantage, without appearing improbable. The simpler this action is, the better for preserving to the picture the character of a portrait.

To make a portrait is, in fact, to represent an individual, and not an action ; and, moreover, to represent him in a complete manner, he must be seen in his general and natural attitude, and not in the complicated and particular position you have placed him in. This observation is applicable with equal force to the representation of a single figure, as to that of a group. The action must be reserved for pictures, and scenes which are intended to represent a passion or a strong sentiment. But, for us, the subject is a portrait, and nothing more. The type, the bearing, and the character, constitute the interest, and this it is that we have to represent. It is in the works of the great masters that we must study the simple, yet grand, method of composing a portrait : Raphael, Titian, Vandyke, and Velasquez, have excelled in this. They have painted the men, and not merely their actions.

We have thus far spoken only of the dimensions and proportions of the model which are to be preserved and embellished in the portrait, regardless of the attitude chosen. We will now proceed to consider the pose of the figure.

The choice of position is extremely important, with regard to resemblance, and it is particularly in this that the artist must understand his model, and have a clear idea of the character of the person he wishes to represent.

The majority of photographers have two or three different positions to which they submit all their models, whether tall, short, long, or small. Moreover, nearly everybody, before having a photograph, studies and chooses an attitude beforehand, by the aid of a mirror, which, in many cases, is quite contrary to their natural bearing ;—a lady, for instance, of doubtful age, will take the free attitude of a young girl ; a small, quiet-looking man, has an ambition to appear proud and bellicose. The result of this is, that a great many portraits appear studied and stiff, of which the least fault is a perfect failure in resemblance, and generally in beauty.

The first condition of a good attitude is, that it should be in harmony with the age, stature, habits, and manners of the individual : secondly,



that it should express the greatest beauty of which the model is susceptible. As we have already stated, the perfect knowledge of the individual is the sole guide for a suitable choice of the position; the defect to be most guarded against, is that caused by borrowed and studied attitudes. The photographer must, therefore, observe attentively, reflecting on his subject, and try, by all possible means, to engage the attention of his model, and to endeavour to make him cease to think of the portrait for which he is come, seizing and noting the natural movements which are visible during these short intervals of forgetfulness.

The model, however, when seen in a natural manner, and perfectly free from any assumed bearing, will still present such a number of attitudes, that it would be very embarrassing to choose, if one had not already formed a clear idea as to the style in which the portrait should be represented. The model of which the character and type should be represented, in a serious and severe style, often present to the artist a number of accidental poses, which, although very natural in themselves, do not, however, give a complete idea of the person, and should, consequently, be rejected. It is the characteristic attitude that must be expressed, not one particular movement, but all the movements—the whole individual, in fact.

It is, moreover, necessary for the position to express unity of aspect, and that it be optically correct. One must, therefore, find a dominant movement which is in accord with all the other parts. The accessory movements, which present themselves naturally, fortify the unity of the figure, and render the aspect of it easy to seize. There will be a natural contrast of the principal lines, and one may invariably find means, in the disposition of the members, to bind these contrasts together by a series of accessory lines, which bring to mind, more or less, the principal ones. The dress, &c., is an important aid in attaining that harmony and unity of movement and form, which constitute the optical beauty of the pose.

We have now to speak of the physiognomy. As we have seen, it is not the real base of the resemblance, as is supposed by most photographers. It is, however, a very important condition, by means of the just proportion given to the expression of the face with regard to the rest of the figure, and completes the harmony, beauty, and resemblance of the portrait.

The great difficulty here, as in the choice of attitude, is to distinguish, from the multitude of different expressions presented by the model, the one which is most in accordance with the sentiment which is intended to be expressed by the *ensemble* of the portrait, and is at the same time the most favourable to a good resemblance. It is always the same law that should guide the artist: it is absolutely necessary that the just expression be visible through all the passing shades of the physiognomy; the fugitive movements of the head, the lips, the eyes; in short, that it should contain, and express in itself, all the minor complimentary details, and give the true character of the individual.

The artist must be strictly on his guard against borrowed and studied expressions, and act with much circumspection if he does not wish to run the risk of being deceived by the change. He will animate the face of the person by a varied conversation, noting in his mind the varied expressions; and, the moment arrived for taking the image on a sensitive plate, he will endeavour by all the means in his power to revive the one that he has chosen. This choice, therefore, requires a good deal of promptitude, of observation, and sure tact. This faculty is not given to all operators, nor even to the most able, and those who are endowed with the sentiment of the art. The changes are so rapid on the visage of the model, the shades so delicate and fugitive, as to elude the eye of the most skilful. It is not the wish of the operator that can give such and such an expression to the features, but the sentiment which animates and gives to the visage a corresponding expression to the sentiment awakened in the mind of the model. The artist will, therefore, seek, at the decisive moment, to revive the ideas which ought to give the model the expression that he has observed and chosen. How is he to succeed in this is a very delicate question. The faculty of imitation is innate in man—sorrow and joy are contagious. If you observe a spectator at the theatre, you will see his physiognomy put itself in unison with that of the actor who interests him; you will see the varied shades and changes of the scene pass over his countenance. The photographic artist has no other means of reviving the expression in the features of his model, than by taking the expression himself. He must, therefore, identify himself



with the moral situation that he desires to create in the person to be represented, which is the only way of giving to his physiognomy the necessary expression for a perfect portrait. How often have we noticed this influence of the operator over the model ! When some unexpected unpleasantness gives our face a cross expression, all the traits of our visage are reproduced in that of the model.

To obtain a good result, it is, before all, necessary that the artist be alone with the model. The least interruption with either will always compromise the success of the operation ; this rule should be most strictly observed in the case of children. One should always avoid instructing them to smile, or to hold the head in such a manner, to be perfectly quiet, and all other such cautions as parents are in the habit of giving their children,—as when their minds are thus confused and pre-occupied, it is almost impossible for the operator to obtain a faithful and pleasing pose. A child should be photographed without its being conscious of it.

The photographic atelier should always be separate from the laboratory, and perfectly removed from all noise, like that of the sculptor or painter.

It would be useless to enumerate all the false and disagreeable expressions of feature observable in so many portraits. We will, however, notice a few of the most ordinary. In one, a smile has been attempted, and the model, according to the instructions of the photographer, has contracted the corners of his mouth, and thereby produced a grimace. In another, a tedious or tired expression replaces one of dignity or gravity. Such defects are caused by the artist not understanding his model, and being, therefore, unable to guide and direct him ; in fact he is wanting in either the practice or theory of his art. People are apt to think that the success often depends on the person to be represented, who will not submit to the wish of the operator, and persists in preserving some false or unfavourable expression. We would answer, that the true artist would always find means of persuading his model to place himself under the necessary conditions. Moreover, he is never obliged to reproduce an absolutely obstinate model ; and he should on no account become responsible for all the deformities that are presented to him.

We should omit one of the principal means of rendering a portrait

resembling and beautiful, by not speaking of the choice and distribution of the light. It is a well-established fact that certain effects are favourable to some features and unfavourable to others. A clear and bright light will increase the features that are already too prominent, and give a hardness to the expression that does not really exist in the model. Again, if features that are naturally of too indistinct a character, be bathed in a soft, diffused light, they will become extremely undecided. The type is thus nearly effaced, and the resemblance and personality of the model entirely lost. If the light is allowed to fall from above, it will augment the projecture of the forehead, throwing an energetic shadow over the eyes. The bridge of the nose, the lower lip, and the chin separate themselves, as it were, in clear lights, from the rest of the face. Such an effect would certainly be very inappropriate for the portrait of a young girl, whose forehead is smooth, profile calm, and of whom the soft blue eyes are the principal charm. Again, it would be too strong for a martial figure, as the thick moustache would throw a shadow over the whole of the lower part of the face, thereby giving too violent an aspect to the whole.

However, if the artist has understood what we have said with regard to the composition of the portrait, and is willing to conform his lights and shades to the style that he has chosen, he will attain the greatest perfection in beauty and expression. By changing the direction of the light, he will soon perceive that all the different effects produced have different significations. Some are calm, sad, terrible; others graceful, gay, and joyful:—each has its particular expression, independently, as it were, of either the nature or arrangement of the subject. It is, therefore, very evident that the general effects of the lights and shades should be appropriate to the character which has been chosen as the most favourable to the portrait. If the portrait be that of a child, the scene should be conceived in a clear and smiling light, free from heavy and profound shadows. If, however, the portrait be that of a man of firm character, it would be necessary to proceed in quite a different manner; the sombre and ampler masses would be alternated by luminous ones,—the shadows powerful, and the lights large and frank.

We will not, however, multiply these examples, as we have said enough to put intelligent and sincere artists in the right path. As



to those who are not endowed with the fine sense of art and beauty, and whose only interest in photography is in a lucrative point of view, the enlightened public will sooner or later do them justice.

The reader will readily understand, after what we have just said with regard to the choice and distribution of light, of what great importance the position of the atelier is in photography. By preference, it ought to be constructed on the top of a house, so that no shadow or reflection from any neighbouring object may interfere with the effect chosen by the artist. It should have all the sides and roof of glass, so as to allow the light to penetrate equally from all four quarters and from above. It should also be provided with a system of curtains, some thicker than others, moved independently of each other by means of light pulleys, so as to enable the artist to direct the light at will, and diminish its light and intensity. The roof should form a sharp angle, and the glass should, like the curtains, be of a blue shade, so as to prevent the light being disagreeable to the eyes of the model.

The atelier should also be spacious, and not, as is very often the case, encumbered by instruments of different kinds. All the photographic accessories, such as scenes, frames, and the like, should be placed in a neighbouring room, which is kept expressly for that purpose. A few objects of art and one or more comfortable chairs, are all that are required to furnish an atelier.

We will add a few words with regard to the choice of dress in the portrait. We hope that the explanations which we have already given have sufficed to show that the dress should be in keeping with the age, character, and habits of the model, and that the photographer should not always content himself with any costume that may be presented to him, as exaggerated dress is almost sure to spoil the portrait. Here is one case, however, in which no choice is allowed to the photographer, namely,—when the person wears a military uniform, or an official dress; here, the exact reproduction of the costume is an essential condition to the resemblance. The operator will, of course, know from his own taste, how to distribute and arrange the dress of his model, so as to obtain optical unity and beauty. We will here call the attention of the operator to a point on which we have as yet but slightly touched, namely,—that all the combinations that we have just enumerated as

requisite conditions for obtaining a good portrait, may be rendered of no effect by a false choice of colour in the dress of the model. The colours which are the most luminous to the eye, do not always produce the most energetic effects. For instance,—red, orange, and yellow, are almost without action; green acts but feebly; blue and violet are reproduced very promptly. Thus, a person of a very fair complexion must not be dressed in either green, orange, or red, as the lights would be too prominent, and the whole portrait would lack energy and detail. The artist is thus obliged to be very particular as to the choice of dress in his model.

Portrait colouring does not belong strictly to the art of photography, and we will, therefore, touch upon it but very slightly. This sort of work should only be confided to special and extremely talented artists. It is not only necessary to avoid losing the resemblance, but the colours used must not be so opaque as to cover and render invisible the shades that have been produced by the light. A photographer who is not a stranger to the laws of colour, may greatly facilitate the task of the painter by a favourable disposition of the lights, tones, &c.

It results, from what we have just read, that it must be difficult to obtain a good portrait in which there is both resemblance and beauty; and that the art of photography can only be acquired by long and constant observation of nature, and patient study. It may be thought that so many difficulties would scarcely meet the emergencies of a production which is required to be rapid and not costly. We would answer, that it is not commerce, but art, that is here implied; and that art seeks after beauty, at whatever price it may be realized. The enlightened part of the public fully appreciates this difference. Why should people address themselves exclusively to photographers who ask the highest prices for their pictures, if not for this reason? The materials and chemical substances are precisely the same in a bad portrait as in a good one. The real cause is the same as that which creates the inestimable value of those small pieces of canvas signed "Decamps" and "Delacroix."

#### ANIMATED SCENES.—*Descriptive and Historical Subjects.*

It is, above all, when required to treat scenes in which the personages are supposed to be in action, that the photographer must have a very



clear idea of the particular language and the resources of his art. In the impression produced by animated nature, the colour often forms a very considerable item. The charm therefrom resulting often compensates for the plainness of the types and the incoherence of the forms, and even constitutes in some cases all the interest and beauty of the scene. Many photographers, in seeking interesting subjects, have been attracted by those countries of the South which have so justly inspired so many of our painters; but the proofs that they have brought back with them have by no means always given a very clear, nor yet pleasing idea of the country they wished to translate. The reason of this is, that amongst the many aspects which would characterise it, they have not always chosen those which are within the scope of photography. They have been carried away by those brilliant effects of costume and colour which are beyond the power of their art, and have, in consequence, neglected those scenes which were within their power. Whilst describing Nature, the photographer must not forget that he is no painter, and he must ask himself if the scene which strikes him would retain the same expression if devoid of all colour? We have already explained the difference between tone and colour; we will, therefore, not repeat this distinction, as it must be sufficiently established in the minds of our readers. We must, however, add, that the constant study of the relation existing between the image itself and the model which is reproduced, must lead the photographer to separate, without effort, every effect of colour in the subject that is presented to him.

Although strictly obliged to imitate the reality, the photographer may, nevertheless, sometimes unite the elements of the scene that he wishes to represent. He may, in fact, choose the personages, and give appropriate costumes to the parts that he wishes them to take, giving them proper attitudes and expressions, and combining the different effects of light and distance, so as really to compose the scene that he wishes to reproduce. It would therefore seem that in all compositions where the colour does not constitute the chief beauty, the photographer may attempt any subject which may be possible to the painter. In an immense atelier, perfectly organized and fitted with backgrounds, reflectors, and all the requisite accessories, the photographer (aided by intelligent models) may, therefore, attempt the most difficult and

complicated pictures, provided the subjects do not necessitate attitudes of very great expression, or rather, which illustrate the passions; as, for instance, in the episodes of battles by Salvator Rosa. Might he not represent interiors like those of Van Ostade, Pierre de Hooze, Chardin, Granet, &c. ? Or all the compositions of merit in the style and taste of Le Ducq, Terburg, Teniers, &c. ? Might he not seek the sentiment of Scheffer and the style of Watteau ? Or why should he not treat historical subjects like Paul Delaroche, in his picture of the death of the Duke of Guise ? Might he not, even, attempt vast compositions like Véronèse, by establishing an immense atelier which would enable him to attain to these most difficult and vast enterprises ?

What we have already said regarding the portrait is enough to discourage this ambitious dream of the photographer, which can never be realised. In fact, we have seen that, to succeed with a *single* figure, it is necessary to invoke the internal sentiments, so as to give the desired expression to the model. It is from the knowledge of the laws of his art that the photographer forms the combinations of his lights and shades, the contrast of forms or of movements, and all other means of expression. However, all his science becomes useless, if he does not succeed in recalling the desired expression in the visage of his model at the moment of execution. In the portrait, the subject is the person himself, and it is, therefore, to his character and nature that the artist looks, and it is there alone that he can obtain the truth.

How, then, would it be possible for the photographer to give to his models any sentiment that he might desire, however foreign to their natural taste and character ? Where could he find actors clever and intelligent enough to be able to identify themselves with their parts, so as to attain any accuracy of expression and bearing in an action which is perfectly strange to their own passions ? The photographic image translates every shade with such exactitude that the least indecision of thought would be apparent in the picture. Some might say, Why not employ some of the most eminent actors ? It is, however, well known that the art of the actor, like that of the artist, often employs conventional signs, and many other such means, to produce true effects ; and that the most natural gesture on the stage appears borrowed or exaggerated in a real action.



The photographic drawing, with its inexorable fidelity, will not fail to indicate most clearly the origin of the personages, and would represent rather the portraits of the actors than a subject of interest or scene of sentiment. It would be possible to give hundreds of examples of this fact. We have, ourselves, attempted to represent Mary Stuart imploring Divine assistance. She is in a kneeling attitude, clasping the crucifix in her trembling hands ; the light falls on her suppliant eyes. The costume is exact, and the artiste chosen possesses in the highest degree the faculty of identifying herself with the personage that she represents, and of expressing the passions with truth. Well ; it is not Mary Stuart that we have represented ; we have neither produced an historical scene nor yet a descriptive picture, but simply the portrait of Madame Ristori.

The photographer would be still further at fault, were he to attempt to create scenes containing a large number of personages in action. Instead of the touching reality that he wishes to realise, he would merely obtain an absurd feint. We must add to the obstacles already mentioned, the impossibility of giving a sufficient reality to costumes made for the occasion. It would be impossible to invent the folds and traces of wear, which are indicative of the character and habits of individuals.

It is superfluous to add, that all the attempts which have been made in this respect have failed. Doubtless many may have seen, at the recent Exhibition, some examples of this description of photography, which have been sent from England ; but few without smiling at the awkward and borrowed air of the personages, through which their anxiety to maintain their parts well is so painfully apparent. The efforts of the models and of photographers, surrounded by the difficulties of an impossible art, were very evident, although the subjects were simple and apparently easy to represent.

It is, however, in some of the stereoscopic images that the effects are produced by these constructors of complicated scenes. They have wished to represent balls, fêtes, games, love scenes, combats, &c. They have not been economical in either personages and costumes, nor yet in accessories of coloured plaster and cardboard. They have even attempted distant backgrounds and impalpable skies, by means of painted canvas and the like. The truth-loving instrument, however, has not

been able to make the change, and, consequently, the faithful translation shows us even the very tissue of the extemporaneous sky. We merely observe a group of incoherent and false figures,—a revolting masquerade, which becomes even more odious from the relief lent to it by the stereoscope.

Shall we also speak of those sad nudities, which display, with a despairing exactness, all the ugliness, both physical and moral, of the models who are paid by the sitting;—of this disgusting commerce, which belongs rather to the tribunal of correction than to the critic of art? Certainly, the representation of the human body is the highest and most interesting aim of the arts of imitation, when not only the plastic but also the moral beauty is sought. Who has not been struck by the beauty and nobleness of the works of Raphaël, or by the grand frescoes of Michael Angelo? What man has ever felt obscene thoughts awakened in him by the sight of those antique statues which are so true and yet so human. The reason is, that in these supreme efforts of art the reality is sanctified or consecrated as it were by beauty. The profound impression which it produces pervades the whole soul, and reigns there sovereign, preventing the entrance of ideas of a very inferior and totally different nature.

If we might treat this subject more fully, we would prove that there is not a work of art which does not contain moral as well as plastic beauty. Try, for instance, without changing in the least the type or the exquisite form, to take from the Venus of Milo the expression of supreme tenderness and serenity which is evident in the features and movement of the neck. You would immediately destroy the entire beauty of the statue, by breaking the true relation that existed between the moral expression and the material type, which constituted the unity of the whole figure. The forms would, moreover, lose their high signification, and although still beautiful in themselves, they would offer but a very inferior interest; they would either be useless signs, or else allow those interpretations which differ so very widely from the moral beauty of the statue.

How can the photographer expect to obtain truly beautiful images with the Venuses and “*saintes de carrefours*?” Even supposing that he succeeded in finding, amongst the etiolated types of our towns, some



exceptional model possessing the principal conditions of plastic beauty, how would he make it assume that moral expression, whether serene or modest, but always grand, which must sanctify forms? We well know with what marvellous perfection the photographic instruments express the most delicate shades of the reality; we know that they produce the actor where we have endeavoured to place the man,—the theatrical action where we have endeavoured to place the natural one. Here the effect would be still more repulsive; one would see immodesty acting chastity; incredulity attempting to parody belief; a face, stamped with all the traces of our prosaic life, trying in vain to attain to ideal expression. When we add to this moral ugliness some revealing signs of the physical imperfections that are to be found in even the most perfect model, it will be easily understood that the photographer should not represent the nude, as far as art is concerned, unless he have a model at his disposition in whom the most perfect physical beauty is allied to a high moral character. Such an exception, however, as this would be indeed rare.

Thus the photographer should, on no account, seek to reconstruct a scene that he has either seen or heard, by reuniting in his atelier all the elements of which it is composed. The difficulty in procuring models, and in obtaining of them, whilst in a position which is foreign to their habits, any true or natural result,—the impossibility also of obtaining backgrounds to give a proper effect, and a great many other circumstances which are far too numerous to be mentioned, form an insurmountable barrier to this path.

It is Nature herself, and nature at liberty, that the photographer should study, fixing it as it were on his sensitive plate before it has lost its movement and its emotion. He must seize it at the most favourable moment, and increase its beauty by more or less profound modifications. The whole art of the photographer consists in seizing and fixing nature. From the infinite variety of scenes that are presented to his view the photographer will choose, by preference, the most simple of those which often reappear with the same traits, and which may, therefore, be easily studied and reproduced.

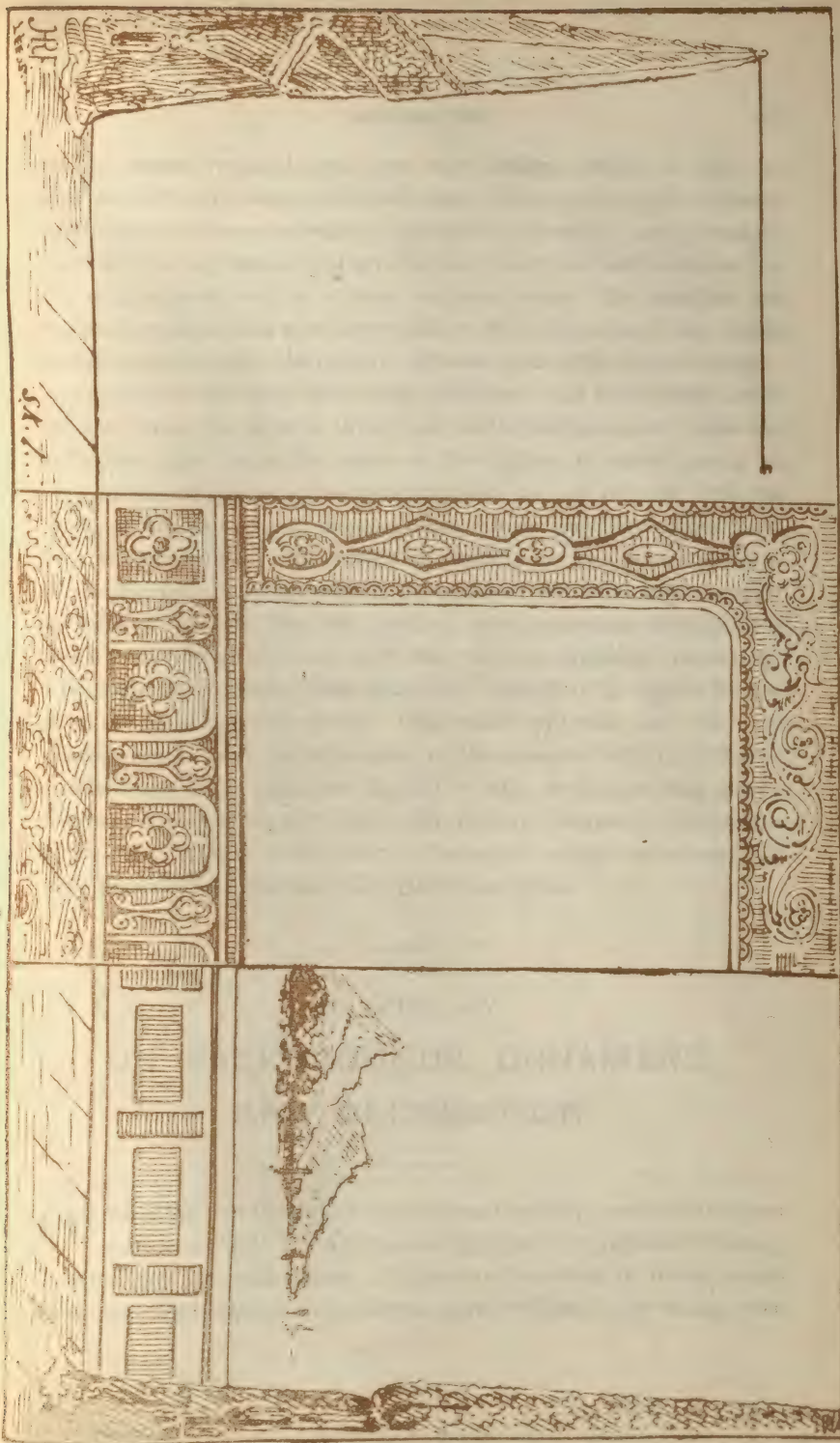
The culture of the field, the different trades, military life, every-day life,—all furnish him with subjects which reappear periodically under

nearly the same circumstances. Thus harvest and the like scenes, in the same country, are generally conducted in the same manner, and present as it were the same appearance, and the same personages. The nature of the work is always the same, and ensures the same groups; the scene no doubt, varies infinitely, but in its arrangement and details only;—that which constitutes its fundamental character can never change. If we take the harvest as an example, the picture will invariably show us a plain which extends to the horizon on every side. The reapers are scattered in different directions: some in a stooping attitude, so as almost to be confounded with the corn that they are cutting; others, standing erect, with sickle in hand; the loaded carts always forming a dominant mass. In scenes of every-day life, the same customs in the same place reproduce the same attitude and the same expressions. Lastly, in military life the personages are grouped according to the same necessities, in the exercises and different duties.

The photographer must act by the scene in the same manner as by the portrait. He will endeavour to find its true signification and character, seeking the necessary combinations for increasing or embellishing this character. The various changes that free nature offers to his observation soon teach him to distinguish the fundamental aspect of his subject from the accidental effects. The rules of composition will guide him in seeking unity by a choice of dominant masses, lines, lights and shades; by the disposition of the subordinate masses bound together between themselves; and, finally, in a dominant mass they will soon make him conceive the various changes to be obtained, where to increase or diminish, determining the most advantageous hour both with regard to the force of light and scene.

This attentive study of nature directed by the laws of Art, will conduct the photographer in choosing from the different aspects which affect the scene, and to represent that which is the most characteristic and the most beautiful. What we have said on the choice of style, in the portrait, proves sufficiently that the artist should, above all, seek that which is the dominant character of the scene, and by what means it may be reproduced to the best advantage. Is the subject sad, gay, gentle, or severe? Does he choose the time when the personages are scattered, or in groups? Will he await the hour when the rays of the





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THE DUTCHMAN'S  
CAPTIVITY





sun are almost vertical, and give very striking effects, or does he prefer the soft harmonies of diffused light? It is evident that a harvest scene ought to be conceived in a gay and lively style; the personages scattered over the entire field give, by the variety of their attitudes, the idea of movement and of a very animated scene. The morning sun will produce the effects most favourable to this expression, if the clouds illuminate and plunge, alternately, different parts of the scene in shade.

Sad subjects are quite differently conceived: the artist would await the hour when the objects throw long melancholy shadows; when the half-shades have taken the place of the lights; he would avoid all combinations of groups, of movements which do not coincide with the character chosen, and of circumstances which might introduce some false or strange note. We could here multiply the examples, and follow the photographer, step by step, in the choice of the style to be adopted for different subjects; but this question must necessitate developments which would be without the limit that we have proposed to ourselves. The reader will supply these details for himself, if he regard Nature from the same point as we do. Observation will soon show him the relations which bind the impression of the spectator with the different modifications of the scene, and he will be able to deduce from them a number of rules which will direct him in a sure manner in the practice of his art. We feel certain that we have said enough to indicate the right path to those who may undertake these studies.

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## CHAPTER XV.

# ON BACKGROUNDS, ORNAMENT, AND DECORATION.

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**O**RNAMENT is that which superadded to utility renders the object more acceptable through bestowing upon it an amount of beauty, it would not otherwise possess. It gives to the object it invests, a new charm, as colour bestows on the flower a new loveliness; now as the colour

cannot be said to be essential to the existence of the flower, so the application of ornament to objects cannot be said to be absolutely necessary.

This is the opinion of a very able and eloquent lecturer on Fine Art and Decorative design, and is particularly applicable to photographs and photography, more particularly in relation to back grounds in portraiture; much has been written on the subject, both for and against, in fact it is in the *Art Photographique*, what many subjects are in "Politics,"—an open question.

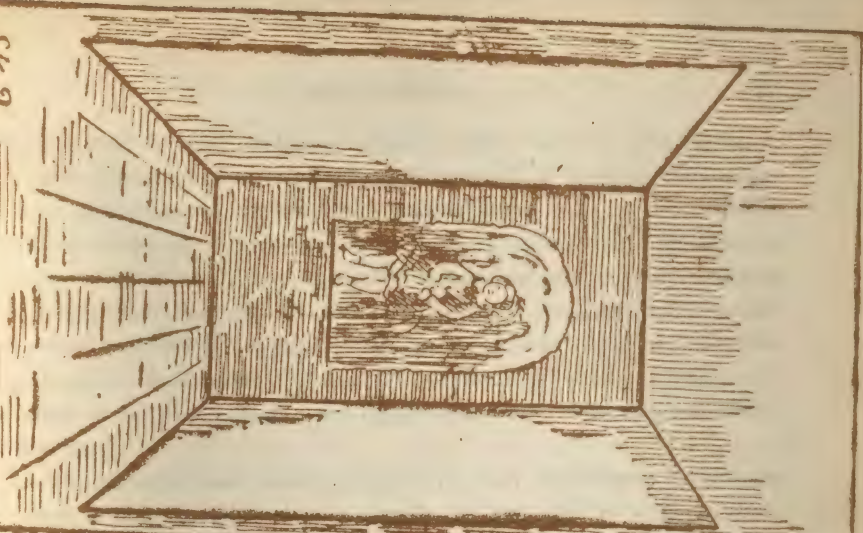
In this as in many other cases, the Photographer must live by pleasing his customers, and if they *will have* backgrounds, they have a perfect right to them, seeing that they pay for their fancy; and the artist must humour them, to retain their patronage and custom, consequently, the better course would be for photographers to pay more attention to their "Back Grounds in relation to Art," and to have them appropriate and in keeping with other objects. Hamlet says it pains him to hear a "robustuous periwig-pated fellow tear a passage to very tatters, pleasing the groundlings, but grieving the judicious;" so with a portrait, how often is the harmony of the subject, and composition, torn up and rent to tatters, by the crowding, and jumbling, of vulgar and inappropriate accessories;—the words of the Danish Prince are aptly applicable to all Photographers,—“Pray you avoid it.”

In the most remote ages there was an evident desire to render objects pleasing and delightful, as the carved figures, temples, and decorated ancient remains, yet existing, abundantly prove. Those engaged on the production of these works, were evidently bent on delighting the mind, through the agency of the eye; a reference to the ornaments of the Chinese, Indians, and Moors, will prove this, as also to those periods denominated Greek, Gothic, Renaissance and Mediæval.

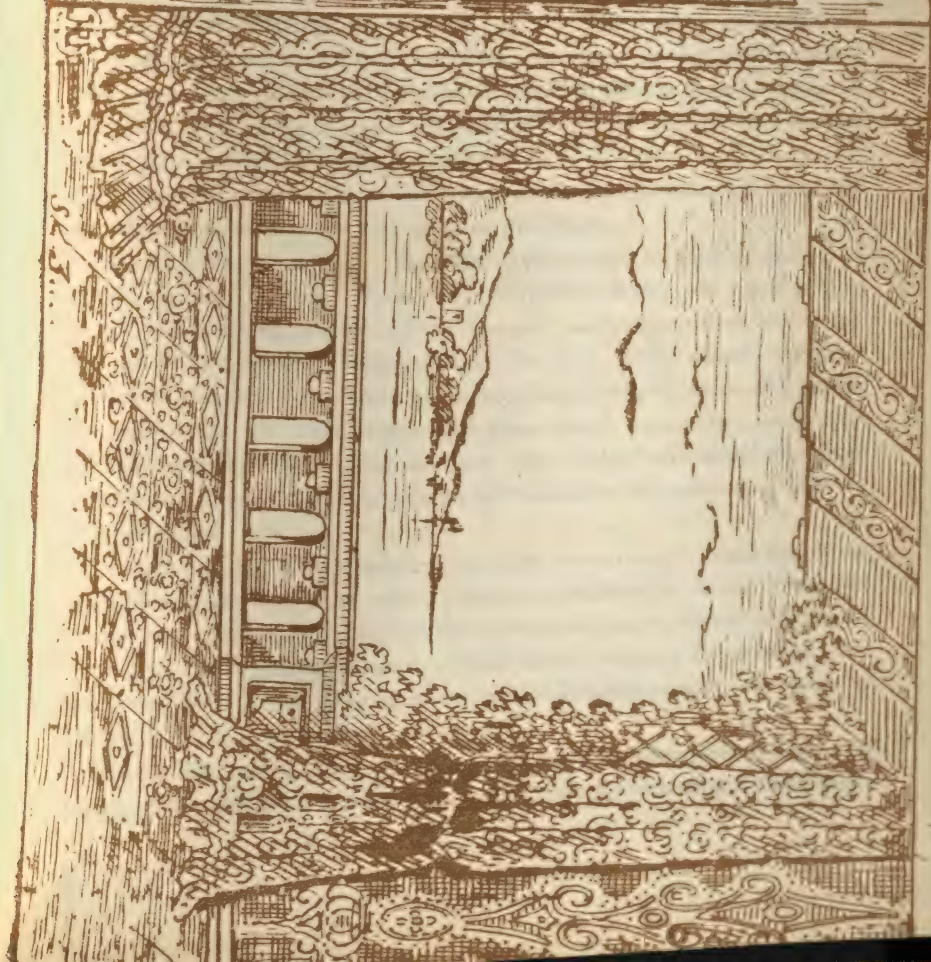
The plain and simple background, is best adapted for those who have no glass-house or studio, and are necessitated to make use of any spot in the open air, or at the back of their houses. If they can get a clean smoothly plastered wall, coloured a light drab, so much the better, this will serve very well for a light backing; while a dark one will be obtained by simply hanging up a black or red shawl, plain ones without figure or ornament at the centres, while the borders and sides in



Sk. 2.



Sk. 3.







ornament may be made to fall in effective folds. The use of a shawl, or any appropriate woollen fabric for backgrounds is of great importance to those operators, whose premises are limited, and who are compelled to follow out their art anywhere and anyhow, as painted back grounds of canvass or linen would soon get creased, cracked and stained, becoming eventually from their dilapidated state, an ugly accompaniment to that they were intended to beautify, while a shake out is all that the woollen ones need to render them fit for use. There are woven fabrics to be obtained of one even colour, some light, some dark : these are well worth attention.

An inexpressive and useful background may be formed by hanging a piece of *open-flowered curtain muslin* by the side of a plain black backing, gently forming it into folds, and looping it in to its place, the black underground shewing through the openings in the muslin, has a very good effect. A piece of the same kind of muslin dyed a dark red or brown, by steeping it in an infusion of logwood shavings, or anatto, made quite hot, will reverse the effect with a white ground, and be in keeping and appropriate as a side ornament for those backings, necessary for white caps, or subjects with light or grey hair.

The English, as a people, are wonderfully fond of finding fault, and in giving their opinion, which they do pretty freely on photographs, invariably pouncing on the slightest blemish, and passing over any merit the work may possess. Photographers for the million should therefore be doubly guarded in having their productions in as good order as possible, by which they will save themselves from much annoyance, and most probably increase their business, for the public will flock for their pictures to those operators who have the character of producing them in the best taste.

A large number of pictures are rendered exceedingly unsightly by the materials for backgrounds, when painted or otherwise, being hung out of square, or if not hung so, by the camera being so tilted and placed as to give them that appearance. This should always be avoided, and the arrangement, such as to shut out in the finished picture, all traces of the edges or tops of the cloths or screens.

One of the greatest difficulties the photographer experiences is that of taking the portraits of children, for what with the timidity of the child,

who generally looks on the camera as some instrument of torture, the interference of the mother, grandmother, or aunt, the photographers chance of success is as 1 against 100. This difficulty may be considerably lessened, and the chances for and against equalled by the use of a screen or backing,—a black frame, with an aperture round, or dome-shaped in the centre, two white sides or wings attached right and left, will keep the child (who is to be placed or held by some one behind the opening) from looking about, and be a most effectual means of causing the little subject to look towards the camera, the white sides will place extra light on the child, and the black centre withdraw light from the camera. (*See Sketch 2*) In taking the portraits of children successful results will be better secured by having a camera back, so constructed that the focussing glass and prepared plate shall be in one continuous plane, and ready to follow each other, by simply pushing the back to the left, when the prepared plate will instantly take the place of the ground glass, avoiding all stooping down or changing the ground screen to the plate holder, causing the little sitter to wander with its eyes to see “what’s going on.” A projection fastened to the front of the camera to hold an apple, orange, or any little article to arrest attention, will be much in the photographer’s favour towards achieving success in a branch of the art, in great request, but very difficult to accomplish.

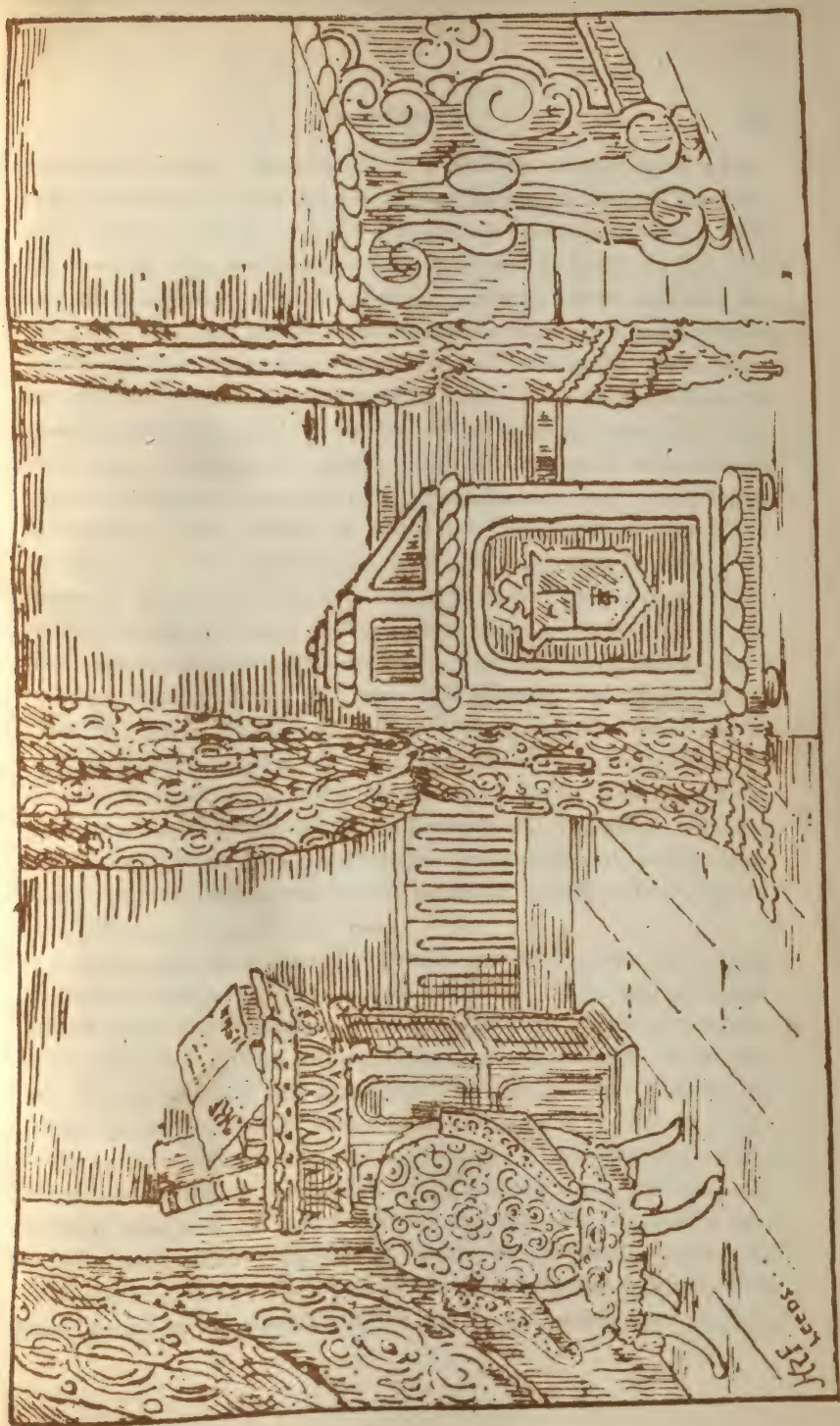
#### LIGHT-HEADED PICTURES.

Though the English, as a nation, are universally considered by foreigners as “a mad lot,” they have (the female portion in particular) very great objection to be made light-headed. This photographers in general, and out-door operators in particular, will often avoid, by suspending from a nail or hook over the head of the sitter an old large umbrella, with the handle cut away from the spring or catch. This will prevent the light from falling directly on the scalp, and do much to obviate and lessen a very general complaint. In this arrangement care must be taken that there are no holes or rents in the umbrella.

#### BACKGROUNDS FOR GLASS HOUSES AND LARGE OPERATING ROOMS.

Those who have space at command may either content themselves with some such simple arrangement as illustrated, (*See Sketch 1,*) or as the





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more elaborate one. (*See Sketch 3.*) The simple arrangement is to have a rod or hooks close up to the ceiling, to which can be attached the white or dark muslin curtains, and the light or dark black cloths, with a plain dark shade running across about three feet from the floor. In the more elaborate arrangement a greater degree of ornament may be used, and side pieces, set pieces, and profile work introduced; yet it must be understood that the art of embellishing or decorating is founded upon some common plan, subject to rules, many and varied in form. Ornament in particular is obedient to this rule and law; and the various principles which govern it, can be taught, learned, and comprehended. A knowledge of art is essential to the creation of the beautiful, and good ornament is rarely produced (but by chance) in the absence of knowledge. Simplicity is said to be charming, it is also valuable, for, as a rule, much that is used in the decorations of walls and mansions, which fetch the highest prices, contain the least amount of work, wall papers for instance, a pattern of two blocks drawn with refinement and taste, will fetch more money than a pattern of twenty blocks that lacks this necessary but scarce accompaniment. As a principle it will be found that the value of the production depends upon the taste and knowledge displayed in its adorning, and not in the costly labour used in its construction. Taste can form things of beauty out of simple means, and with simple adjuncts, and the most valued are usually those where ornaments are sparingly used, as extravagance in the use of ornament offends as much against good taste, as extravagance in dress.

From the great circulation of "Punch" and other comic and satirical publications, the public have a keen relish for "Fun," and are consequently much prone to seize upon the ridiculous points of whatever comes under their notice. Photographers should therefore be cautious as to the backgrounds and accessories they use in their pictures, for though England is a much boasted *land of liberty*, it is very far from a *land of equality*. Those who live in the service of the great and wealthy look completely out of place when sitting formally among the draperies, furniture, vases, and pillars, which they are generally supposed to have no further connection with, beyond dusting and keeping in order. All this should be avoided, the operator should quietly and delicately make himself aware of his sitter's position in life and society, and shape his

course accordingly ; if this were attended to, it would do away with much ill-feeling and many ill-natured observations.

#### ACCESSORIES FOR THE STUDIO.

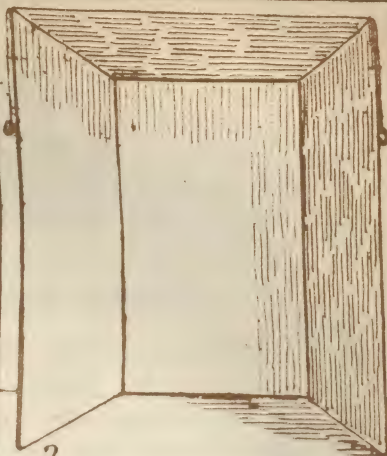
Of these there are endless varieties in the shape of carved chairs, library tables, Elizabethan ottomans, occasional tables, cheval screens, work-tables, Canterbury, what-nots, Louis Quatorze tables, Sutherland tables, card tables, cheffioniers, Davenport ;—with pianos, book-cases, sea-scapes, land-scapes, balustrades, balconies, etc., etc. ;—in fact, hundreds of odds and ends that this age of adaptation has brought under the notice of the practical photographer. When used with skill and judgment many of the above add to and set off a picture, but if used hap-hazard had better be left alone. Those who have a large run of business and the means at their disposal can supply themselves from any of the manufacturing artists and dealers in photographic adjuncts for the studio. Two or three chairs may be made out of one by having a variety of backs to slip into slots at the back legs, and carved or other profile fronts to be placed before the front legs. The same may be done with tables, by removing the cloths and fixing on sham fronts. Imitations of carved work can be made by planting on thick pieces of Kamptulicon, which can be easily cut with a knife into a variety of effective patterns. Papier mache and carton pierre are compositions principally of soft paper pulp, that can be moulded into ornaments of various kinds ; also the old compo. of glue, whiting, and treacle ; this can be pressed into moulds and used in various ways as ornaments in imitation of old oak furniture. Profile imitations that are partly modelled out will always be more serviceable and effective than those simply painted and shadowed, as the shadows in the latter will mostly be on the wrong side, while the modelled or thickened-out piece of furniture will cast its own shadow right or left according to the arrangement of the room. All worked-out mouldings on balustrades and set pieces are far preferable to painted ones. So with draperies, those formed by canvas or red moreen pulled up into folds, are far superior to anything that can be painted. There are several kinds of fabric at the upholsterers called damask, Utrecht velvet, and figured rep ; some that have the patterns extremely broad and bold are well adapted for drapery. A judicious and not too crowded use of many of the articles mentioned



The Hooded, or CABINET  
Back Ground



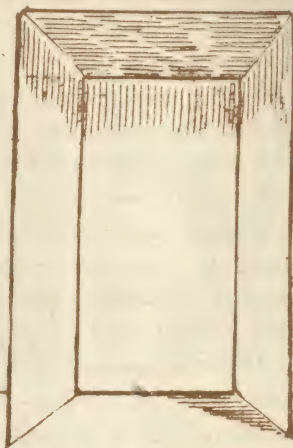
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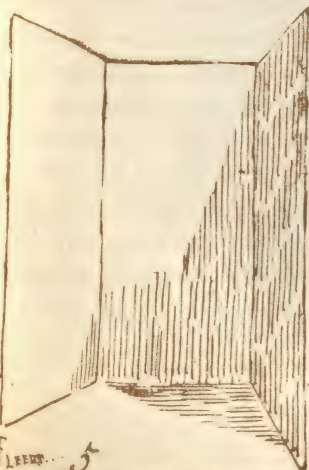
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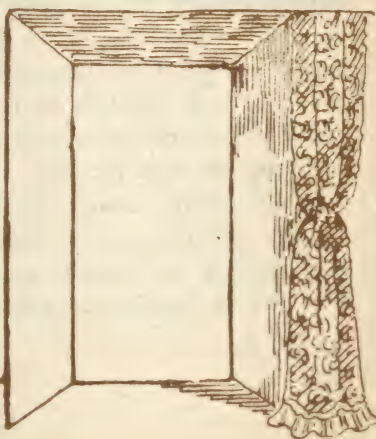
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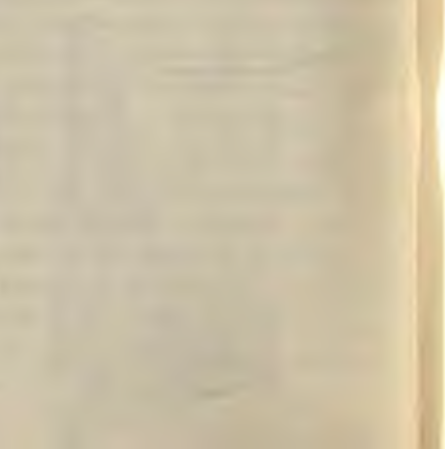
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in this short treatise—with particular attention as to the play of light and shade—will produce satisfactory results, while the introduction of too much and objects out of place will have an unmeaning and contrary effect.

#### THE HOODED, OR CABINET BACKGROUND.

A description of something of this kind was contributed by the author to the *British Journal of Photography*. He had seen it in use by an artist, at Newcastle, in the time of the daguerreotype some 15 or 16 years ago, before the days of collodion and carte de visite. This person produced all his effects of light and shade, by the judicious and dexterous use of a large piece of sail cloth, thrown over two poles. From seeing this it occurred to the writer of the present article, that something similar might be arranged with covered frames, and introduced in any operating room. The working out and effects produced by the same, will mainly depend on the skill and taste of the person using it. Fig. 1 is a frame similar to a kitchen clothes-horse, hung with web hinges, to turn either way. The dimensions of these frames must be entirely regulated by the space the operator may have at command. Fig. 2, the sides of the frame drawn out, and a dark cloth covering the hood or top to form an open cabinet, giving a dark shade on one side, light the other. Fig. 3, the sides placed closer together, by which means the whole of the light will be shut out, and a dark recess obtained. Fig. 4, 5, and 6, are a series of varied effects in light and shade, produced by placing the sides at various angles, and using pieces of light and dark cloth on the insides of the frame, to assist the tone of light required. Curtains can be hung from the sides, and formed into various folds and arrangements—fitters up of studios, and those who wish to possess a series of accessories, to fill out their pictures, cannot do better than look over the volumes of the *London Journal*—the front page engraving of which publication has for a long series of years emanated from the pencil of an artist, who, as a draughtsman on wood, arranger of groups, and play of light and shade, has never been excelled, if ever equalled. Among some of these cuts will be found examples of great use to those who wish to improve their taste in such matters.—Contributed by an "Old Hand."

## CHAPTER XVI.

## TRANSFERRING, NIELLO PAPER, MICA, &c.

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**T**HE method of transferring is adopted by the Americans much more frequently than in England. Transfers are on black leather instead of paper. To take them, it is necessary to have a good positive taken with collodion which is thick, tough, and not powdery. Then prepare a mixture composed of—

Water	:	:	:	:	:	:	:	1 ounce.
Alcohol	:	:	:	:	:	:	:	$\frac{1}{2}$ ounce.
Nitric Acid	:	:	:	:	:	:	:	10 drops.

After the positive is dry, it is floated over with this mixture two or three times, to take away any grease; and the same is done with the glazed side of the American cloth, on which the picture is to be transferred. Pour off the fluids, and laying the black cloth with the wet surface upward, place the positive face down upon it, being careful to avoid air bubbles; put them both in a pressure frame in a warm place for about an hour, when they will be dry, and the leather will leave the glass quite clean.

Niello paper is another American substitute for glass. It is made in thin sheets of the different photographic sizes, enamelled black on both sides. It may be stuck on a glass or used alone, as it is quite stiff enough. A good thick collodion should be used, and a bath of silver (forty grains to the ounce) to give the best results, or the pictures will not have sufficient contrast. It is said not to injure the bath.

Mica, or talc, is a very suitable substance for taking small portraits upon, as it is easily cut and simple in manipulation. It is a transparent mineral, which can be split up into very thin sheets: the only drawback is the difficulty of procuring it free from flaws; If, however, the larger sized sheets are purchased, we find there is more care used in the selection.

The mode of manipulation is this; a piece of mica being selected free from flaws, is moistened on one side with the tongue, and placed on a



piece of glass a little larger than itself. It is then pressed firmly in its place, in the centre of the glass, with a chamois leather, and gently rubbed, if it be not clean. The collodion is now poured on as usual, and flowed over the edges of the mica on to the glass plate. The remainder of the process is the same as if on glass; then the picture is varnished and coloured, if required: a penknife is placed under the edges of the mica, which easily separates it from the glass. It may then be backed with either black varnish or velvet. These pictures should be cut with sharp scissors, or the mica is liable to crack.

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## CHAPTER XVII.

### HOW TO REDUCE SILVER.

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**O**LD silver baths, and other solutions containing silver washings, &c. should be thrown down in the state of chloride of silver thus: add dilute hydrochloric acid or common salt until no more chloride can be precipitated; stir with a glass rod, so that the flakes may settle, then pour off the upper clear portion; the precipitate should now be washed several times with common water, and, on settling, drained off from the chloride; after being thus well washed, it may be dried with a gentle heat, and placed in a Hessian crucible, intimately mixed with twice its weight of a mixture of carbonate of potash and carbonate of soda; or borax and carbonate of soda; the top of the crucible should now be covered up with clay, and placed in the centre of a fire where the heat can be increased to a bright red by the aid of bellows; on taking out the crucible and breaking it a button of silver will be found at the bottom. This is metallic silver, which can be made into nitrate by dissolving in pure nitric acid, and crystallizing; it should afterwards be re-dissolved in distilled water two or three times, and re-crystallized, to get rid of any impurity.

All washings of dishes, prints, etc. should be made to run into a

large jar containing a lump of salt, and they should be made acid from time to time by the addition of a little hydrochloric acid. The upper liquid may be poured off as it forms; and when the deposit of chloride is sufficiently thick, it may be drained and treated as above.

## CHAPTER XVIII.

### HOW TO TELL THE STRENGTH OF THE SILVER BATH.

THIS is a point of importance to the photographer who uses large quantities of paper, as his printing bath will be liable to constant change, and unless it be kept up at one standard the prints will deteriorate. The argentometer is sufficiently accurate for the printing bath, and is easily used. A portion of the silver bath should be poured into the test glass sold with the instruments, and the argentometer inserted; it will sink in the liquid to a certain depth, and the point on the stem where the silver solution cuts will give the number of grains to the ounce. (See *Fig 1.*)



Fig. 1.

This argentometer, however, is not so accurate in registering compound solutions of silver containing iodine, bromine, and æther; in these cases a careful testing has to be adopted, in which an argentometer of this form has to be used (*Fig 2.*) Take of well-dried and perfectly pure chloride of sodium  $84\frac{1}{4}$  grains (common salt will not do,) and dissolve it in 20 ounces of distilled water; this should be put in a bottle and labelled *Test Solution*. The grains should be weighed with exactness, or the result will be inaccurate.

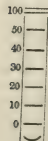


Fig. 2.

Next make a second solution, by dissolving 20 grains of pure bichromate of potash in one ounce of distilled water. This method will test any solution of nitrate of silver, except the aceto-nitrate bath used to excite collodio-albumen plates.



To test your silver bath, take the argentometer, like (*Fig 2*), and drop into the bottom *one drop* only of solution of bichromate of potash, then fill the tube up to the lowest division marked 0 with your silver solution, now add a few drops of the test solution, and shake. The colour of the precipitate will be brick-red. Keep adding the test solution very gradually, until the precipitate changes to a lighter tint, shaking at each addition. Continue to add drop by drop of the test solution until the precipitate suddenly changes to white, then stop. Now observe opposite which division on the argentometer the liquid stands, and this indicates the number of grains of nitrate of silver contained in each ounce of silver solution. Thus, supposing it stands at three divisions above 30, this would indicate that the silver bath contained thirty-three grains of silver to the ounce.

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## CHAPTER XIX.

### LENSES, HOW TO SELECT AND TEST.

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WE have already spoken of the importance of procuring these of good quality and the work of an experienced maker. There are now many makers of photographic lenses, but comparatively few of first-rate standing. The quality of the lenses produced by the latter is now generally recognized, and presents but little difference, it may therefore be safely disregarded, and our aim in this chapter will be directed to giving such information relative to the *class of work* which each description and size of lens is best suited to, as will be most useful to purchasers in determining their choice, always supposing that they at the same time neglect not the obtaining of good quality as well as suitableness in kind for the work intended.

Some years back, the photographic lenses in general use were of but two kinds, viz., the ordinary single combination for views, and the double portrait combination for portraits and groups. Now we have to

record a much greater variety, and the choice necessarily becomes more difficult. The portrait combination, from the great aperture in proportion to its focus (or "angular aperture,") which its construction admits of, remains "par excellence" that which is best adapted for portraiture, at least, under the ordinary circumstances of being used under a glass roof, and occasionally in weak light. While, for any other work than portraiture, or for even this in good light and not under cover, several of the other kinds of lenses are more or less applicable, and not unfrequently used. We thus have, for portraiture, "par excellence," the *Portrait Combination*, and for all other work, including general landscape, architecture (exterior and interior), copying, &c. When the image is to be received upon a flat surface, we have a choice of the following five varieties of lenses, viz.—

1st. The original Single Combination Meniscus Landscape or View Lens.

2nd. The Patent Aplanatic Meniscus Lens.

3rd. The Orthoscopic or Petzval Compound Lens.

4th. The Double Cemented Compound, consisting of two cemented lenses and including the American Globe Lens.

5th. The Triplet Compound, consisting, as now usually made, of three cemented lenses.

The above list, it may be observed, does not include Mr. Sutton's Patent Panoramic Lens, it not being suited to take pictures on a flat surface, and requiring a special form of camera and subsidiary apparatus not suited to other lenses—all other forms of lenses, as enumerated above, may (if suited as to size) be used in one and the same camera—a matter of considerable convenience to the photographer. The respective merits and applicability of the five varieties of view lenses enumerated above may be judged of from the following particulars derived from our own experience and that of others.

1.—The original single combination view lens. This, the oldest photographic lens has, from the outward form, combined with a stop placed at a suitable distance in front, the advantages of covering well a field embracing a large angle of view with considerable evenness of definition; and, from the circumstance of having only two surfaces (except those united by a cement,) it has the least possible liability to



produce fogging. It has the disadvantage of a certain amount of distortion, which, however, is of no consequence for views in general, but is objectionable for architectural subjects, when a building shewing straight lines occupies a large proportion of the field of view.

2.—The aplanatic view lens. This lens is an improvement on the former in having its spherical aberration adequately corrected, and consequently admitting of the use of a larger aperture of stop, thereby constituting it a quicker acting lens, while retaining the advantage of the fewest possible surfaces. Its lateral pencils are very free from "astigmatism," and it permits of the stop being placed nearer to itself than the former construction. The lens, consequently, covers a very large angle of view, and it is now used extensively by some of our first photographers. There is, it would appear, an increasing feeling that, for views in general, it is preferable to use a single combination rather than the more compound lenses, the latter being always more or less liable in working, in the open air, to produce what is termed a "fogged" negative.

3.—The orthoscopic or Petzval lens.—This lens, introduced about the same time as the last mentioned, or aplanatic, has with it the advantages of a good correction both of the spherical aberration and of the lateral pencils, but it is not calculated to cover so large an angle. It has the disadvantages of six uncemented surfaces and of producing distortion, about equal in amount, but of a contrary kind to that of the single combinations. The orthoscopic lens producing elongated corners of the field, the single combination, the reverse or dumpy corners.

4.—The double (cemented) combinations, under which head we class all combinations which consist of two cemented compounds, and which, therefore, have 4 uncemented surfaces, and, consequently, include the American globe lens. These combinations have the advantage of being free, or nearly so, of distortion, with a good correction of the lateral pencils for astigmatism. Their spherical aberration is, however, in general, not well-corrected, and therefore they cannot be used with a larger aperture or stop, or there is considerable curvature of the field which also necessitates the use of a small stop. The American globe lens is an instance of the latter. This (No. 4) form of lens has not hitherto been extensively used.

5.—The triplet lens.—This combination, as now made, usually consists of three cemented lenses ; it, therefore, has six uncemented surfaces. It has the advantages of no perceptible distortion and a very flat field, which render it well adapted for copying maps, and for architectural photographs. Its disadvantages are considerable astigmatism in the lateral pencils, and slowness of action and liability to fogging, consequent upon the number of its uncemented surfaces. Therefore, while the triplet is a valuable lens, where freedom from distortion is an object, the single combination in its improved form (viz., the aplanatic) has in other respects, the advantage, viz., freedom from astigmatism, covering a larger field, quicker in action, and the least possible liability to fogging.

Having described the respective properties of the several kinds of lenses in use, we shall next offer some suggestions relative to a choice of *size*, beginning with the portrait lenses.

There is a general, but incorrect, idea that a short focus lens is intrinsically quicker-acting than a longer focus. The quickness of any particular form of lens depends upon the *proportional*, not the actual, aperture in use. The chief difficulties in using a large angular aperture for portraiture are the rotundity of the object, and a slight curvature of field in the lens. The first of these difficulties is *not lessened* by using a short focus, but the latter difficulty is *increased*, especially in "Carte" portraiture, when the figure is standing. We recommend, therefore, for Carte pictures the use of a lens which requires a distance of not less than fourteen to sixteen feet between figure and lens, which will require a room of at least five feet more in length to work in ; but where the room is limited in length, there is, of course, no resource but to adopt a lens of sufficiently short focus. We may add that this recommendation agrees with the practice of some of the very best operators, who usually use lenses of still longer foci than we have here recommended.

For the sizes of lenses required, (or desirable,) for taking of larger portraits, it is impossible to lay down precise rules, sufficient information is, for most cases, to be obtained from the lists published by the makers of lenses, to which the following general observations may prove a useful addition for guidance in selection. First, the portrait lens is not to be expected to include a large angle of view, especially when a large angular aperture of the lens is in use. In general, the subject to be



photographed should be not less than 2 to  $2\frac{1}{2}$  times its own greatest linear measure from the lens, which will require the lens to be in focus 2 to  $2\frac{1}{2}$  times the linear field to be covered. These proportions are, however, to be understood as applicable to cases where a large aperture of the lens is used. When a portrait lens is stopped down to two-thirds or one-half of its full aperture, it is capable of including a considerably larger angle of subject, and, consequently, of covering a much larger field; no precise rules therefore can be given in respect of these, and a judicious use of the stops supplied with the lens, (always using the largest which the visual image shews to be compatible with sufficient distinctness of image) will much increase the capability of the lens in respect of the size of portrait which it can command.

#### SIZES OF LENSES FOR VIEWS.

Sufficient information in respect of this is given in price lists. The photographer of views will occasionally find a great convenience in having two lenses differing in foci for the one camera, one lens of about the ordinary proportion, another of a shorter focus, and therefore including a larger angle of view. He may, also, advantageously be prepared with lenses of two or more kinds—for example, a single combination for general work, and a triplet for an architectural view or interior. The examination of view lenses for quality is more simple than that of portrait ones, particularly if the lens be attached to a camera whose field is of the dimension suited to the focus of the lens. In this case, the camera being directed to a well lighted object, which need not be very distant, some well defined part, such as a placard with large letters, or window bars, chimney tops, &c., forming a strong contrast of dark and light, is to be brought to the centre of the field and focussed, when, by turning the camera horizontally, the same object is brought to the extreme of the field, and the relative distinctions of the image at centre and edge, judged of. It is well in such experiments to use a rather large stop, or the largest available; also, in trying several lenses with the intention of forming a judgment of their respective merits, both the apertures of the stops, and the linear extent of the fields should be so arranged as to be in direct proportion to the foci of the lenses.

## TRIAL OR EXAMINATION OF LENSES.

To conduct such with certainty requires considerable judgment and experience. We give a simple method of procedure which is little liable to uncertainty, and must be supposed to be within the reach of all.

Set up against a wall or vertical screen, at about the height of the camera, a row of printed handbills, or such like—if these be similar and contain each two or three sizes of type, so much the better—let the entire length be fully such as the lens may be expected to cover, for example, 6 feet in length for a carte lens, of medium size,—place the camera directly and centrally opposite, and at a distance of 2 to  $2\frac{1}{2}$  times the length of the object. Now, using the whole, or largest, aperture of the lens, focus alternately for the central and extreme lateral images. If the lens be good these will be nearly equally distinct, if not, there is astigmatism; (a focussing glass of tolerably high power should be used.) Next, having focussed very carefully for the centre, draw a fine short line on the sliding tube of the mount with the point of a pen knife, keeping the blade in close contact with the outer tube, then focus for the extreme lateral images, and draw a similar line. The distance between these two lines shows the amount of curvature of the lens for the angle of field in use. Next, focus that part of the image which is about two-thirds from the centre, or one-third from the ends, and take a photograph of the whole length. If the most distinct parts of the photograph are these which were focussed for, it follows that the visual and actinic foci of the lens coincide (*provided the camera be correct.*) In this simple manner three of the most important requisites of the portrait combination are, with a little care, adequately tested, viz., freedom from astigmatism, flatness of field, and coincidence of foci. Whether the lens is well corrected for spherical aberration can be judged of sufficiently from the distinctness of the image when accurately focussed, and by the appearances or *character of the indistinctness* of the image at equal distances within and beyond the focus being similar; for the latter observation the bulb of a thermometer placed either in sunlight or near to an argand or moderator lamp, is an excellent object, being a very delicate test.

There is one point on which it is right to give a caution,—cameras are frequently not quite correct in having the distance of the ground glass



and the sensitized plate to come to the same distance from the lens, and such an error, even if of one-fiftieth of an inch, may either cause a lens whose foci really coincide to appear not to do so, or a lens whose foci do not coincide to appear to coincide ; therefore, in trying a lens for coincidence of foci, it is better to reject the use of the ordinary ground glass screen, and instead thereof to use in focussing a piece of fine ground glass of the same size as the sensitized plate, placed, while being used for focussing, in the same dark frame or chassez, which is subsequently used for the sensitized plate, the hinged cover of the dark frame being raised to enable the visual image to be seen and focussed while a finger of the operator keeps the piece of ground glass in contact with the corner supports of the frame or chassez.

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## CHAPTER XX.

### FORMULÆ.

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**W**E intend in this chapter to give a large number of tried formulæ for the use of those who may not find the method recommended in each process to their satisfaction ; but we would impress upon all photographers, especially amateurs, the folly of changing their method for every new one that turns up : this we know is a great fault, especially in change of collodion. We have known some operators to try six or eight different kinds, resulting in the complete overthrow of the working of the silver bath : therefore we would say to all tyros in the art :—If you have a solution which works pretty well, keep to it until you have really proved whether *it* is faulty, or the fault lies in something else.

We shall not have much variety in the silver solutions, but we agree with M. Disderi that there is great benefit derived from increasing the strength of the bath in cold weather. We cannot, therefore, do better than quote his method :—

## SILVER BATH FOR WINTER.

No. 1.	Pure Nitrate of Silver . . . . .	16 drachms.
	Distilled Water . . . . .	20 ounces.

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## SILVER BATH FOR SPRING AND AUTUMN.

No. 2.	Pure Nitrate of Silver . . . . .	13½ drachms.
	Distilled Water . . . . .	20 ounces.

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## SILVER BATH FOR SUMMER.

No. 3.	Pure Nitrate of Silver . . . . .	10 drachms.
	Distilled Water . . . . .	20 ounces.

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## IRON DEVELOPERS.

## FOR SUMMER.

No. 1.	Protosulphate of Iron . . . . .	15 grains.
	Glacial Acetic Acid . . . . .	15 drops.
	Water . . . . .	1 ounce.
	Alcohol . . . . .	20 drops.

## FOR WINTER.

No. 2.	Protosulphate of Iron . . . . .	30 grains.
	Glacial Acetic Acid . . . . .	15 drops.
	Water . . . . .	1 ounce.
	Alcohol . . . . .	20 drops.

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No. 3.	Protosulphate of Iron . . . . .	4 drachms.
	Acetate of Soda . . . . .	1 drachm.
	Beaufoy's Acetic Acid . . . . .	2 ounces.
	Water . . . . .	16 ounces.
	Alcohol . . . . .	1 ounce.

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No. 4.	Protosulphate of Iron . . . . .	1½ ounces.
	Nitrate of Baryta . . . . .	1 ounce.
	Water . . . . .	20 ounces.
	Alcohol . . . . .	1 ounce.
	Nitric Acid . . . . .	40 drops.



No. 5.	Protosulphate of Iron	. . . . .	10 grains.
	Nitrate of Potash	. . . . .	7 grains.
	Glacial Acetic Acid	. . . . .	15 drops.
	Alcohol	. . . . .	6 drops.
	Distilled Water	. . . . .	1 ounce.

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No. 6.	Protosulphate of Iron	. . . . .	15 grains.
	Acetic Acid	. . . . .	10 drops.
	Formic Acid	. . . . .	12 drops.
	Water	. . . . .	1 ounce.
	Alcohol	. . . . .	10 drops.

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No. 7.	Sulphate of Iron and Ammonia	. . . . .	25 grains.
	Beaufoy's Acetic Acid	. . . . .	40 drops.
	Alcohol	. . . . .	15 drops.
	Water	. . . . .	1 ounce.

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No. 8.	Sulphate of Iron and Ammonia	. . . . .	15 grains.
	Saccharrated Sulphate of Iron	. . . . .	10 grains.
	Beaufoy's Acetic Acid	. . . . .	$\frac{1}{2}$ drachm.
	Water	. . . . .	1 ounce.

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IRON DEVELOPER BY M. MARTIN (*Professeur de Physique a Paris.*)

Dissolve

No. 9.	Protosulphate of Iron	. . . . .	1 ounce.
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in

Water	. . . . .	5 ounces.
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Also dissolve—

Water	. . . . .	1 ounce.
Acetate of Lead	. . . . .	25 grains.
Glacial Acetic Acid	. . . . .	5 drachms.

Mix.

A precipitate is formed,—allow to settle, then filter. Then add the following solution,—

Water	. . . . .	19 ounces.
Sweet Spirit of Nitre	. . . . .	$1\frac{1}{2}$ drachms.
Acetic Ether	. . . . .	1 drachm.

## IRON DEVELOPER BY M. DISDERI.

No. 10. Water	. . . . .	105 ounces.
Protosulphate of Iron	. . . . .	18 ounces.
Acetic Acid	. . . . .	3½ ounces.
Sulphuric Acid	. . . . .	½ ounce.
Iron Filings	. . . . .	1 ounce.

Mix all together, and expose the solution to the air for two or three days, when the colour will change from a green to a yellowish red. Filter it before using.

## PYROGALLIC DEVELOPERS.

No. 1. Pyrogallie Acid	. . . . .	4 grains.
Glacial Acetic Acid	. . . . .	40 drops.
Distilled Water	. . . . .	1 ounce.

No. 2. Pyrogallie Acid	. . . . .	80 grains.
Acetic Acid	. . . . .	½ ounce.
Water	. . . . .	16 ounces.

No. 3. Pyrogallie Acid	. . . . .	20 grains.
Distilled Water	. . . . .	8 ounces.
Formic Acid	. . . . .	1 ounce.
Alcohol	. . . . .	5 drachms.

## INTENSIFIERS.

No. 1. Bichloride of Mercury	. . . . .	1½ grains.
Hydrochloric Acid	. . . . .	3 drops.
Chloride of Gold	. . . . .	½ grain.
Distilled Water	. . . . .	1 ounce.

No. 2. Nitrate of Silver	. . . . .	14 grains.
Glacial Acetic Acid	. . . . .	16 drops.
Distilled Water	. . . . .	1 ounce.

No. 3. Distilled Water	. . . . .	1 ounce.
Nitrate of Silver	. . . . .	8 grains.
Citric Acid	. . . . .	16 grains.



No. 4.	Pyrogallic Acid . . . . .	2 grains.
	Citric Acid . . . . .	1 grain.
	Water . . . . .	1 ounce.
	Solution of Nitrate of Silver . . . . .	a few drops.

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No. 5.	Iodine . . . . .	1 grain.
	Iodide of Potassium . . . . .	2 grains.
	Water . . . . .	1 ounce.

Cover the picture with this solution, and leave it for five or ten minutes, then wash well ; now develop afresh with the pyrogallic and citric acid solution number 4. All this may be done in daylight.

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## No. 6.

Bichloride of mercury is an excellent intensifier, to be used after the plate is fixed and dried. An over-exposed positive, which has been well developed with iron, answers best. If the collodion does not adhere well, it is better to varnish the edge of the plate, to prevent the film coming off.

Moisten the plate with water, then pour on a solution of bichloride of mercury, five grains to the ounce. The colour of the film soon changes to gray, when it must be stopped, for if it becomes white it is spoiled. Wash well, and pour on a solution of iodide of potassium, one grain to one ounce of water. This changes it to a greenish grey, when the plate is again washed.

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## No. 7.

Process for intensifying positive pictures on glass, or weak negatives—suited for winter practice and instantaneous work of all kinds, &c., and *especially* adapted for *pictures* produced by the iron development. Prepare the following solution :—

No. 1.	Bichloride of Mercury . . . . .	1 ounce.
	Hydrochloric Acid . . . . .	1½ ounce.

Dissolve, and add 7 ounces of distilled water. Label the bottle containing this solution—POISON.

No. 2.	Cyanide of Potassium	1/4 ounce.
	Distilled Water	12 ounces.

To use these: after the picture is taken, *well wash*, pour on No. 1 solution in such a way as will permit of its covering the plate with *one unbroken flow*. Pour off the excess, and retain the plate in the hand, keeping the solution well on it, till the picture turns a kind of sickly or *moony* white colour. Now *well wash* again, and *in the light*, plunge the plate in solution No. 2, which must be used in a dipping bath. It must be kept in this solution for *just 2 seconds*, wash away the solution *immediately* afterwards. The picture will now be found perfectly black. This is the outline of this process, but it may be found necessary to modify it according to the collodion, &c., used. If for example, the cyanide solution should be found too strong, the picture will change from black to white again before it can be washed; if the solution should be too weak the picture will be streaky. Thus the *precise* strength of solution No. 2 must be found by practice.

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### PLATE CLEANING SOLUTIONS.

No. 1.	Water	1 ounce.
	Hydrochloric Acid	2 drachms.
	Iodine	10 grains.

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No. 2.	Tripoli	1/2 ounce.
	Smalts	1/4 ounce.
	Solution of Potash	1 ounce.
	Water	4 ounces.

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No. 3.	Solution of Potash	1 ounce.
	Water	6 ounces.
	Prepared Tripoli	1/4 ounce.



## COLLODIONS.

## FOR POSITIVES.

Pyroxyline . . . . .	8 grains.
Rectified Æther. . . . .	1 ounce.
Alcohol (.816) . . . . .	1 ounce.
Iodide of Cadmium . . . . .	5 grains.
Iodide of Ammonium . . . . .	3 grains.
Bromide of Ammonium . . . . .	2 grains.
Tincture of Iodine . . . . .	<i>quantum suff.</i>

## FOR NEGATIVES.

Rectified Æther . . . . .	1 ounce.
Alcohol (.800) . . . . .	1 ounce.
Alcohol (60 O.P.) . . . . .	1 ounce.
Pyroxyline . . . . .	16 grains.
Iodide of Potassium or Sodium . . . . .	8 grains.
Iodide of Cadmium . . . . .	6 grains.
Bromide of Cadmium . . . . .	2 grains.

## VARNISHES.

No. 1.	Best Picked Amber . . . . .	300 parts.
	Chloroform . . . . .	300 parts.
	Benzole . . . . .	500 parts.
No. 2.	Caoutchouc . . . . .	$\frac{1}{2}$ drachm.
	Mineral Naptha . . . . .	10 ounces.
	Asphaltum. . . . .	4 ounces.
No. 3.	Soft Copal . . . . .	40 grains.
	Benzole . . . . .	1 ounce.
No. 4.	Alcohol (.816) . . . . .	14 ounces.
	White Stick Lac . . . . .	1 ounce.
	Picked Sandrac . . . . .	1 drachm.

## TONING SOLUTIONS.

Silver Solution, 60 grains to 100 grains per ounce.

After printing, well wash and immerse for a short time in the following solution:—

No. 1.	Acetate of Soda . . . . .	1 ounce.
	Water . . . . .	20 ounces.

This solution may be used over and over again; then tone in

Chloride of Gold . . . . .	15 grains.
Acetate of Soda . . . . .	1 ounce.
Water . . . . .	35 ounces.

If the chloride of gold be acid (as most samples are,) neutralize with carbonate of soda. Fix in

Hyposulphite of Soda . . . . .	4 ounces,
Water . . . . .	24 ounces;

in which a little chalk should be kept.

No. 2. Chloride of Gold . . . . .	15 grains.
Carbonate of Lime . . . . .	150 grains.
Chloride of Lime . . . . .	24 grains.
Water . . . . .	20 ounces.

Have three dishes ready: into the first put solution of acetate soda 1 ounce to one pint of water; in the second dish, put 6 ounces of toning solution and 40 ounces of water; into the third dish, put 14 ounces of toning solution and 20 ounces of water. After printing a quantity of pictures, immerse them one by one into the acetate soda solution, avoiding air bubbles, turn them over once, and pass them one by one into the first dish of toning solution; turn them over, and pass them on the same way into the second dish of toning solution. Here the prints must be watched and turned about; when ready, put into a dish of water. Fix in hypo. 5 oz. to 20 oz. This will not keep like the first toning solution, so only just sufficient to be used should be mixed.

No. 3. Distilled Water . . . . .	10 ounces.
Phosphate of Soda . . . . .	18 grains.
Chloride of Gold . . . . .	1 grain.

No. 4. Water . . . . .	12 ounces.
Biborate of Soda . . . . .	16 grains.
Chloride of Gold . . . . .	1 grain.

No. 5. Water . . . . .	18 ounces.
Pure Exsiccated Carbonate of Soda . . . . .	12 grains.
Chloride of Gold . . . . .	1 grain.

No. 6.

Fill a bottle with—

(A)

Distilled Water . . . . .	9 ounces.
Chloride of Gold . . . . .	15 grains.



Fill a second bottle— (B)

Distilled Water	1000 grains.
Acetate of Lime	10 grains.

Mix according to the number of prints required to tone, as the solution will not keep. Thus, for 40 Cartes de Visite, take 1 ounce from bottle (A,) and add to it 2 ounces from bottle (B.) Place the mixture in a procelain dish over a spirit lamp. When the liquid becomes heated it soon becomes colourless; allow it to boil only for a few seconds, then allow to cool, and it is ready for use by adding sufficient water to it to cover the dish. The prints should be immersed in the liquid. They will take about fifteen minutes to tone.

It is requisite that the hyposulphite soda, for fixing, should be kept neutral by either bicarbonate soda or chalk.

No. 7. Distilled Water	2 pints.
Nitrate of Uranium	3 grains.

neutralized with chalk.

Acetate of Soda	50 grains.
Chloride of Gold	6 grains.

neutralized with carbonate of soda.

Chloride of Lime	20 grains.
Alcohol	1 ounce.

These should be mixed separately, shaking all the while. This solution will keep well. The tones are a rich warm tone. A piece of chalk should be kept in the hypo.

No. 8. Water	10 ounces.
Common Washing Soda	2 grains.
Chloride of Gold	1 grain.

neutralized with carbonate of soda.

### DISDERI'S TONING SOLUTIONS.

Water	2½ ounces.
Hyposulphite of Soda	200 grains.

Dissolve this in a measure, and in two others make the following solution:—

Water	1½ ounces.
Hyposulphite of Soda	32 grains.
Water	¼ ounce.
Chloride of Gold	1 grain.

Pour the solution of gold, drop by drop, into that of hyposulphite soda, last mentioned, agitating at each addition, till it is all added. Now take your proofs and immerse them in the first bath of hyposulphite soda, avoiding air bubbles ; it is best to put them in singly, and to take them up and move them in the order in which they were placed in the bath. In about twenty minutes the action of the bath will have been sufficient ; then wash well and allow to dry. Then place in the second bath, composed of hyposulphite soda and gold, putting the proofs in in the same way, and using the same precautions. They require to be well watched, as the action is very quick in this bath, generally five minutes being sufficient. Wash as usual.

## DISDERT'S TONING, No. 2.

Water . . . . .	35 ounces.
Chloride of Sodium . . . . .	12 drachms.

Pass the prints rapidly through this ; then place them in the following :

Water . . . . .	35 ounces.
Hyposulphite of Soda . . . . .	7 ounces.

Wash well, and then place in the following bath of gold :—

Water . . . . .	35 ounces.
Chloride of Gold . . . . .	15 grains.
Chloride of Sodium . . . . .	1 ounce.

## DISDERT'S TONING, No. 3.

Place the prints in—

1st: Water . . . . .	35 ounces.
Chloride of Sodium . . . . .	1 ounce.
2nd: Water . . . . .	35 ounces.
Chloride of Gold . . . . .	15 grains.
3rd: Water . . . . .	35 ounces.
Hyposulphite of Soda . . . . .	7 ounces.

## DISDERT'S TONING, No. 4.

1st Bath: Water . . . . .	32 ounces.
Chloride of Sodium . . . . .	3 ounces.

Wash, and place in the following—

Water . . . . .	32 ounces.
Chloride of Lime . . . . .	65 grains.
Chloride of Gold . . . . .	9 grains.

The prints obtain a violet tone in this bath. The prints must be taken



out before they obtain the blue tone ; then wash, and place in the following bath :—

Water . . . . .	32 ounces.
Chloride of Gold . . . . .	15 grains.

The prints require watching in this bath, or they soon pass the proper colour, and take a colder one. Wash again ; and, lastly, fix in

Water . . . . .	32 ounces.
Hyposulphite of Soda . . . . .	6 ounces.

Wash well. This formula is recommended for all subjects requiring vigorous black prints : for copies of engravings, stamps, maps, &c., it is the best we have used.

DISDERI'S TONING, No. 5—(what he uses himself.)

Water . . . . .	32 ounces.
Hyposulphite of Soda . . . . .	6 ounces.

Place the prints, on taking them out of the printing-frame, in this bath, which should be newly prepared. Let them remain about ten minutes ; then wash and plunge them in the following solution :—

Water . . . . .	32 ounces.
Hyposulphite of Soda . . . . .	6 ounces.
Chloride of Gold . . . . .	15 grains.

Allow the prints to submit to the action of this bath from five to ten minutes ; the tones obtained are a beautiful warm brown : it is very simple, and still is found to be the best for producing the warm tones for which his prints are so much admired.

TONING ARROWROOT PAPER—(Disderi's method.)

On taking the prints out of the printing frame, pass them very rapidly into the following bath :—

Water . . . . .	32 ounces.
Chloride of Sodium . . . . .	10 drachms.

Pass them again very quickly into the following :—

Water . . . . .	96 ounces.
Chloride of Gold . . . . .	30 grains.
Chloride of Sodium . . . . .	15 drachms.

Wash, and then plunge in the following :—

Water . . . . .	96 ounces.
Hyposulphite of Soda . . . . .	15 ounces.
Bicarbonate of Soda . . . . .	45 grains.

Water . . . . .	35 ounces.
Chloride of Gold . . . . .	15 grains.
Sal. Ammoniac . . . . .	$\frac{1}{4}$ ounce.
Hyposulphite of Soda . . . . .	1 ounce.

#### AMMONIA-NITRATE PAPER.

Excite on nitrate of silver bath, made by dissolving nitrate of silver in distilled water, and adding liquid ammonia, drop by drop: this causes the solution to become turbid, but by continuing the addition it will again become clear. No more ammonia than is just sufficient to redissolve the precipitate should be added; and to be certain that no excess of ammonia is present, it is better to add a drop or two of dilute nitric acid. Paper floated on this bath is much more sensitive than on the ordinary silver bath. The proofs should be printed a little deeper than usual, and thoroughly washed.

The toning solution is made in the following manner:—

No. 1. Acetate of Soda . . . . .	75 grains.
Phosphate of Soda . . . . .	75 grains.
Distilled Water . . . . .	30 ounces.
No. 2. Chloride of Gold. . . . .	15 grains.
Distilled Water . . . . .	3 ounces.

To be made neutral with carbonate of soda.

No. 3: Nitrate of Uranium . . . . .	15 grains.
Distilled Water . . . . .	3 ounces.

To be neutralised with carbonate of soda. When all these solutions are made, add No. 2 solution to No. 1, and shake; then add No. 3, shake again, and filter. The prints require to be kept in motion in this bath, as it is very energetic. Fix in fresh hyposulphite of soda containing a little chalk.

#### ANOTHER METHOD.

Excite the paper three minutes on the following:—

Distilled Water . . . . .	1 ounce.
Nitrate of Silver . . . . .	40 grains.
Nitrate of Ammonia . . . . .	3 grains.

Hang up to dry, and, before using, pin the sheets up in a box containing a large wide mouthed bottle full of ammonia sp. gr. .880 the stopper of which is removed. Allow the paper to remain closed up in this box for



ten minutes, when the fumes of ammonia will have rendered the paper sufficiently alkaline, then place the stopper on the bottle. It is better to keep the paper in this box till it is wanted. This is one of the best methods of ammonia fuming we have tried, and it answers admirably with the uranium toning solution. This process is much used in the large American photographic establishments, and is in great repute with the operators of that country.

*N.B.—It will of course be understood that all prints after toning with any of the foregoing formulæ require the final thorough washing described in the chapter on Printing.*

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## CHAPTER XXI.

# DEFECTS, AND HOW TO REMEDY THEM.

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**W**E will endeavour, as far as we are able, to divide these into different heads showing the results, &c., arising from each, with their remedies.

### 1.—FOGGING.

This will probably be the first annoyance an amateur will meet with : it also often troubles an old practitioner. The cause is sometimes noxious vapours in the dark room, arising from new paint, ammonia, or gas ; the remedy for which is obvious. The developing solution may also cause fogging, from being too strong of iron in summer, and too weak of the acetic acid. It should be remembered that in warm weather the iron developer may be reduced in the strength of iron, when it still may require more acetic acid and *vice versa*. Over exposure, or over development, also both produce fogging. Light penetrating the dark room, or light finding its way into the camera, or the sun striking into the lens, will also produce it. If the bath be too alkaline, fogging will be the result ; the remedy is to add a few drops of dilute nitric acid, till the bath slightly reddens litmus paper. The reverse, too great acidity of the bath, may cause it ; the remedy being the addition of oxide of silver or pure carbonate of soda. A very great cause of fogging is from light getting into the dark room, from the yellow glass not being of the proper colour, or from the yellow calico used having changed color. This is a

point which has caused an endless amount of trouble. Fogging may also be produced by using a small bath to excite large plates in. This is a great fault. We would advise all persons to have their baths fully twice the size of the plate used, then there is not such a constant change taking place in the bath by the weakening of the silver. This remedy for fogging is often useful:—put about a drachm of the ordinary cyanide solution into a pint of silver bath, shake well, allow to stand, and then filter. On the addition of a little acid, it will work well. Some collodions also cause a great deal of foggiess; therefore use that of a well-known maker, and adhere to it. In speaking of the light striking the lens, and thereby causing fog, we would impress upon all photographers the advantage of having their galleries made in such a manner and of such a length, that the end at which the camera is placed should be screened from the light; and if the room be entirely glass, we should recommend a dark awning to be made, to place immediately over the camera. By this means the necessity of using a hood for the lens is avoided.

## 2.—SPOTS AND STAINS.

These are a source of some trouble; the great cause of both is want of cleanliness, dirty plates being the greatest cause of all. The cleaning of plates should never be left to boys. Lifting the plate out of the bath too soon, or making a pause in putting it in, will make stains. If the developing solution be poured on in one place, and not quickly made to flow over the plate; or if the developing solution be short of alcohol when an old silver bath is used, stains will be the result. Dirty carriers for the plates are also a great cause of stains. The corners for these should always be made of silver wire instead of wood, and they should be wiped after every plate, or pieces of clean blotting paper put in. If the plate be not well drained on blotting paper before putting into the camera, it is liable to stain. Crape lines are often caused by the collodion being too thick, or not being flowed evenly over the plate; immersing the plate too soon in the bath will also cause them. Spots are also caused by using collodion too soon after mixing with the iodizer. A good remedy is to use a collodion filter, which will be found extremely useful in preventing spots, &c. Sometimes a single drop of water added



to an ounce of collodion, will prevent specks, which have been very troublesome. Dust in the camera, or dark slide, or operating room, will produce spots. Sometimes they are caused by want of filtering the developing solution or silver bath. Dust in the dark room may be remedied by using oilcloth on the floor, and sprinkling the place with water in warm weather. The plates should always be freed from dust by a flat camel-hair brush, before pouring on the collodion.

### 3.—WANT OF DEFINITION OR SHARPNESS.

This may be caused in many ways: the most probable one is imperfect focussing. Most of the ground glasses are too coarse; either a plain glass should be used, or a glass coated with collodion, or ground glass varnish. It is absolutely necessary for taking the *Carte de Visite*, that a focussing lens should be used; a pocket magnifier, or reading glass of small size, answers very well. If the sitter move, or the camera stand be not firm, there will be loss of sharpness also. If the chemical and visual foci of the lens are not coincident, and if the focussing glass and the prepared plate do not occupy the same place, indistinctness results.

To test the perfection of a camera, with respect to the proper relative positions of the focussing glass, and prepared plate, being satisfied that the foci of the lens used are quite coincident,\* take a picture of an object which has been focussed on the ground glass slide, supplied with the camera, then take another, which has been focussed on a piece of ground glass previously inserted in the place of the prepared plate, and if there be any difference of definition, the camera is faulty. The exact *amount* of error in the position of the prepared plate with respect to the focussing screen must then be ascertained, and at once corrected.

### 4.—MISCELLANEOUS DEFECTS.

Blue stains in a glass positive are caused by not well washing off the developing before pouring on the fixing. The shadows clear, but the light parts chalky, in a positive on glass, is caused by keeping the developing solution on too long.

If a negative be under-exposed, and also over-developed, the picture

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\* See chapter on Lenses, for the determination of this particular.

will be very intense in some parts, but the shadows will be very weak ; but if a negative be over-exposed the shadows will be very dense. If the hyposulphite of soda used in fixing is not well washed off a negative, it will soon begin to crystallize under the film. Cold and dark weather, or too much acid in the silver bath, will cause negatives to be weak and difficult to intensify.

#### 5.—DEFECTS IN PAPER PRINTS.

First, *Marbling*.—This is a common fault with tyros : they wish to float too many sheets of paper on a small quantity of silver bath. Marbling is caused by the silver solution being too weak. It should always be kept up to 60 grains to the ounce at the least, which may be easily done by using the argentometer frequently. Marbling is also caused by particles of dirt floating on the silver solution. These should be removed by skimming the surface with a piece of blotting paper.

Second, *Spots*.—These are caused either by metallic spots in the paper, or some impurity in the sensitising bath : the remedy for the former is to use *unrolled* albumenized paper, which does not pass through iron rollers.

Third, *The print has a yellow tinge in the whites* ; and, on looking through, brown patches are seen. This is caused by the print not being sufficiently long in the hypo, or the hypo is too weak. Yellowness of the whites may also be caused by the print being examined and toned in the light, instead of in a dark room. Mealy-grey prints are caused by over-toning, or defective paper. We have not found either of the last two defects to occur when a toning solution containing chloride of lime or acetate of soda, is used. Sometimes the prints will not tone quickly. This has a variety of causes. If the gold solution be too weak, too acid, or too alkaline, such will be the case. Remedies :—Add more gold solution ; if too acid, add pure carbonate of soda ; if too alkaline, add a little dilute hydrochloric acid. Smears, stains, and fingermarks, are caused by being too slovenly in toning, &c., it is imperative that a man should be tidy, and scrupulously clean in his habits, to make a good printer.



## CHAPTER XXII.

## A CHAPTER OF HINTS, &amp;c.,

OR, ENTREMETS PHOTOGRAPHIQUES.

**H**OW TO SAVE WEIGHTS.—Having ascertained the weight of each chemical that you require to make your bottle full of solution, take a pill box and make a counterpoise with shot, mark the name of the chemical and the weight for which it stands on the lid, then you only require to put these boxes in the scale-pan, and you have no trouble in reckoning your weights every time. For instance, if you have to make an iron developing solution in a Winchester quart bottle, take the box marked *Iron*, put it into one pan, and in the other crystals of iron to balance. Citric acid, pyro., hypo., nitrate potash, &c., may all have their boxes.

**SENSITISED PAPER WITH AMMONIA FUMING.**—This plan we strongly recommend to photographers, as we believe it possible to be made of very great advantage, if but properly managed. The plan at present recommended is to suspend prepared paper, before exposure, in a box in which the fumes of ammonia are generated, either by a sponge dipped in it being suspended within, or by means of a little ammonia being placed in a shallow dish.

**HOW TO PAINT OUT SKIES.**—Place the negative on a small easel, in such a situation that the light may strike through it, then with a sable pencil and long handle, trace the sky line first with any moist background colour, then fill in with a good body of colour. The advantage of this over black varnish is, that if you overpaint you can easily take it out with a pencil dipped in clean water. Lastly, paint round the outer edges with black varnish.

**MOUNTING PRINTS.**—Cut out, by the aid of a glass guide made for the purpose ; one surface being ground, to prevent its slipping in cutting. Dextrine and starch are very good for mounting, and far preferable to gum arabic.

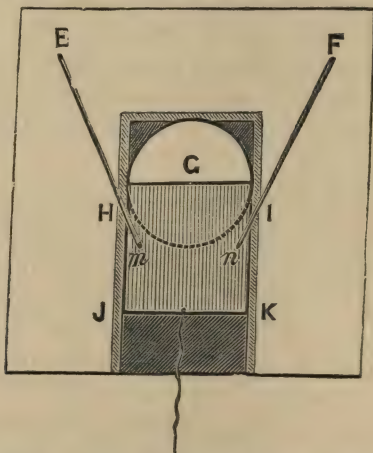
**WASHING PRINTS.**—Use one of the new washing trays with a hole in the corner, or those made with a syphon for carrying off the water.

**TO GET STOPPERS OUT OF BOTTLES.**—With a small feather anoint all round the neck of the bottle with olive oil ; place near to the fire for a quarter of an hour, then give a few gentle strokes with a piece of wood, and the stopper will generally give way.

**TO DECOLORIZE THE SILVER BATH.**—Add half an ounce of kaolin to one pint of silver solution ; shake well, allow it to settle, and then filter. Or use the plan recommended by Maxwell Lyte : dissolve  $10\frac{1}{2}$  drachms of phosphate soda, and  $5\frac{1}{2}$  drachms of carbonate of soda in 36 ounces of water. Add one drachm of this solution to each pint of silver solution ; or make the silver solution slightly alkaline, then add solution of citric acid, until a precipitate takes place ; or make the silver solution alkaline, and put it in the sun for a day, and then filter.

**VIGNETTE GLASSES.**—Paint an oval on a white card with Indian ink, having the edges nicely softened. Place this against the wall, and take a negative from it with the lens out of focus.

**INSTANTANEOUS SHUTTER.**—This is one of the cheapest and best methods we have seen, having been used by a friend of ours with great



success for many months. Have a piece of wood made to fit inside the camera, just behind the lens, having a hole cut in the centre to allow the free working of the lens. Round this opening, and down to the bottom



of the partition, a slight frame should be fastened (*see fig.*), so as to allow a piece of wood, H, I, J, K, to slide up and down freely in a groove. This piece of wood, H, I, J, K, should be of such a size that when up to the top it completely covers the opening for the lens G, and when down it leaves it completely open. Two nails should be put in this wood, at *m* and *n*, and two others in the partition at E and F. The nails E H and F I should then be connected with two elastic bands. A piece of cord should then be attached to the bottom of the square piece of wood, and a small hole made in the camera to admit it. Then, by pulling the string, the wood is brought down to occupy the bottom place; and, on taking the hand away, it is drawn up again instantly, by the tension of the india-rubber bands. By this contrivance, the feet in a portrait can be exposed the longest; and the whole may be made for 2s. 6d. It is well to blacken the whole with lamp-black and glue.

TO CLEAN OLD GLASSES.—The best method of cleaning glasses that has been used is to put them into a dipping bath of gutta percha for a few minutes, containing half an ounce of fluoric acid to one pint of water. They must not be left too long, or the glass will become etched like ground glass.

TO CLEAN LENSES.—Screw them out of their fittings; then polish them with a chamois leather, on which a small quantity of smalts (powder blue) has been rubbed. This will make lenses very clear and brilliant.

LIQUID COLOURS.—Mix a little of Judson's dyes with a spirit of wine, and apply artistically.

TO TAKE NITRATE OF SILVER STAINS FROM THE FINGERS.—If recent, washing and rubbing with a piece of pumice stone will remove them. On first rising in the morning is the best time to remove such stains, as the skin is moist and more porous. A solution of iodine in cyanide of potassium is also used, but should be applied with *great caution*, for if there be any scratches, &c., on the skin very dangerous results may ensue; even if the skin be quite sound, the condition of health, &c., at the time of using such solutions may promote their absorption into the system with equally disastrous effects. We know an instance of a photographer being rendered insensible for a long time after thus cleaning his hands. The use of pumice stone is *always* to be recommended in preference.

**TO TAKE STAINS OUT OF LINEN.**—If these are caused by nitrate of silver, the best method of erasure is to apply tincture of iodine to the spot, let it remain a short time, then wash it and apply a strong solution of hyposulphite of soda, and well wash again. This method may be adopted for cleansing the hands. If the stains are produced by the iron developing solutions rub some finely powdered "salt of lemon" on the spot, moisten with a little water, and let it remain till the stain has disappeared, then well wash the linen. This salt is poisonous.

### HOW TO FORETELL THE WEATHER.

As this is a subject interesting to photographers, we append some weather indications for their guidance. A good Barometer should form part of the "furniture" of the photographer's home:—"The most trustworthy symptoms of fine weather are:—gradual rising of the barometer when the wind in changing follows the sun's apparent daily course; a grey morning sky, especially when the first streaks of twilight appear in the horizon; a red sunset; a light blue mid-day sky; and dew at any time. A steady fall of the barometric column; a pale yellow sunset; a red morning sky; soft-looking dingy clouds drifting rapidly by, at a low elevation; a change of wind contrary to the sun's apparent motion; unusual distinctness of the landscape; much twinkling of the stars, and low flight of birds, all presage rain. A high dawn, or sunrise above a bank of dark clouds; a bright yellow sunset, with rosy tints in the east; rapidly driving scud; a deep blue sky and sudden changes of the barometer, all indicate approaching wind and stormy weather. A mackerel sky, either after continued rain or settled fine weather, indicates an approaching change; the more complete and durable, the higher the clouds appear to be."—*From De la Rue's Indelible Diary, edited by J. Glaisher, F.R.S., &c.*

**A RISING BAROMETER.**—A "Rapid" rise indicates unsettled weather. A "Gradual" rise indicates settled weather. A "Rise" with dry air, and cold increasing in summer, indicates wind from northward; and if rain has fallen, better weather is to be expected. A "Rise" with moist air and a low temperature, indicates wind and rain from northward. A "Rise" with southerly wind, indicates fine weather.



A STEADY BAROMETER.—With dry air and a seasonable temperature, indicates a continuance of very fine weather.

A FALLING BAROMETER.—A "Rapid" fall indicates stormy weather. A "Rapid" fall, with westerly wind, indicates stormy weather from northward. A "Fall" with a northerly wind, indicates storm, with rain and hail in summer, and snow in winter. A "Fall" with increased moisture in the air, and the heat increasing, indicates wind and rain from southward. A "Fall" with dry air, and cold increasing (in winter), indicates snow. A "Fall" after very calm and warm weather, indicates rain, with squally weather.

### FRENCH WEIGHTS AND MEASURES.

WEIGHT.			LIQUID MEASURE.		
		Grains.			Minims.
1	Gramme	15.432	1	Cubic Centimetre	16.896
2	"	30.864	2	"	33.792
4	"	61.728	4	"	67.584
6	"	92.592	6	"	101.376
8	"	123.456	8	"	135.168
10	" (Decagramme)	154.353	10	"	168.960
100	" (Hectogramme)	1543.234	28.4	"	1 ounce
1000	" (Kilogramme)	15432.348	1000	Cubic Centimetres, or 1 Litre =	
1	Decigramme	1.5434		61 Cubic Inches = 35 ounces, 1	
1	Centigramme	0.1543		drachm, 36 minims.	
1	Millegramme	0.0154		Gramme is also used for liquids, and	
				equals about 17 minims English	
				1000 Grammes = 35½ ounces.	

### CHAPTER XXIII.

## ANTIDOTES TO THE POISONS USED IN PHOTOGRAPHY.

IF any of the *strong acids* be inadvertently taken, mix carbonate of soda, carbonate of magnesia, calcined magnesia, or chalk, into a paste with water, and swallow freely. If none of these remedies be at hand,

scrape the *whitewash* off the walls or ceiling, and use it in the same way.

Salts of ammonia, soda or potash, sodium, potassium, or ammonium.—If these are taken, vomiting should be excited by tickling the throat with a feather, or taking a dose of antimonial or ipecacuanha wine.

CHLORIDE OF GOLD.—Mix calcined magnesia with a little water and swallow it, or take several whites of eggs.

CYANIDE OF POTASSIUM.—All measures, to be of service in cases of poisoning with this substance, must be taken immediately after the dose has been swallowed. Every photographer should have bottles of the following solutions ready prepared:—Dissolve 20 grains of salts of tartar in 2 ounces of water. Keep this in one bottle and label "Solution of Salts of Tartar, antidote for Cyanide of Potassium, No. 1." In another bottle dissolve 10 of grains Protosulphate of Iron in 1 ounce of water and add 1 drachm of Tincture of Steel, and label "Iron Mixture, antidote for Cyanide of Potassium, No. 2." Administer the whole of No. 2, and when swallowed follow it immediately with the whole of No. 1.

NITRATE OF SILVER.—Administer common salt with magnesia and emetics.

BICHLORIDE OF MERCURY.—The white of an egg, mixed with water and swallowed as soon as possible, to be followed by emetics.

*N.B.—In all cases of poisoning send some one for the nearest medical man, only employing the remedies here named in his unavoidable absence.*

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## CHAPTER XXIV.

# REGISTRATION AND POSTAL ARRANGEMENTS.

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### REGISTRATION.

**B**Y the new Copyright Act, passed in July, 1863, photographers secure the sole right to reproduce all original works they may have produced, which had not been sold before the passing of the Act, and which



shall be duly registered according to its provisions. The registration is to be effected at Stationers' Hall. A form of memorandum, copies of which are to be had at the Hall, price one penny each, is to be duly filled up; and it is desirable that a copy of the photograph be annexed to the form. This memorandum is to be taken to Stationers' Hall between ten and four, and one shilling must be paid for each photograph to be registered.

The filling up should be as brief, but as distinctive, as possible. The Registering Officer declines to receive particulars by post, as it would often involve explanatory correspondence. The registration must be effected in person, or by an agent. For the convenience of photographers residing in the country, if they send their forms, properly filled up, with fifteen postage stamps to cover expenses, to the publisher of the *Photographic News*, he will send a messenger to the office, and secure the registration. Explanations and acknowledgments will be made from week to week in the last column of the *Photographic News*.

### POSTAL REGULATIONS.

**LETTER POST.**—In this is included letters passing between places in the United Kingdom, the rate being regulated by weight.

Weighing not more than $\frac{1}{2}$ oz.	1d.
" more than $\frac{1}{2}$ oz., but not exceeding 1 oz.	2d.
" " 1 oz. " " 2 oz.	4d.
" " 2 oz. " " 3 oz.	6d.

and so on, 2d. being charged for every additional ounce. This requires to be paid in advance, or the postage is doubled. It is not allowable to send any parcel containing collodion or other combustible matter, glass, liquids, or sharp instruments.

**BOOK POST.**—These packets can be sent to any place in the United Kingdom, at the following rates:—

Not more than 4 oz.	1d.
More than 4 oz. but not exceeding 8 oz.	2d.
" 8 oz. " " 16 oz.	4d.
" 16 oz. " " 24 oz.	6d.
" 24 oz. " " 32 oz.	8d.

The postage must be prepaid. It is required that all book packets be

open at the ends. They may contain any number of separate books, or other publications, photographs, and cartes de visite of all kinds. All binding, pasteboard for protection of photographs, or rollers, will be allowed. No book packet can be received if it exceeds two feet in length or width. No invoice or explanatory note is allowed.





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